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PROCESS FOR THE PRINTING OF FIBROUS TEXTILE MATERIAL MADE OF POLYESTER FIBRES

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It is known that it is very difficult to dye and print polyester fibres owing to their dense molecular structure and low absorption of moisture connected therewith. Since they do not contain any distinctly functional groups, for example, acid or basic radicals, all those dyestuffs do not come into consideration which combine with such groups, either by formation of a salt or of hydrogen bridges, for example, acid dyestuffs, chrome developed dyestuffs and the like. When printing, that is to say when dyeing locally, which is carried out under entirely different conditions than the dyeing in dilute aqueous baths, the difficulties are the same in principle, so that the above mentioned dyestuff classes have hitherto not been of any value.

For the printing of polyester fibres, the so-called dispersion dyestuffs as were developed above all for the dyeing and printing of acetate rayon have proved to be the most favourable class of dyestuffs. In view of the above stated special properties of polyester fibres, only unsatisfactory results are obtained with these dyestuffs when they are used in aqueous solutions or under the steaming conditions customarily applied in textile printing.

For the dyeing of polyester fibres in aqueous baths there are used so-called carriers, agents which facilitate the penetration of the dyestuff into the fibre. A schematic application of the experiences gained in dyeing of polyester fibres with dispersion dyestuffs with the use of carriers in aqueous baths onto the printing process is not possible. The specific working conditions under which the printing process is carried out, for example, the physical state of the printing paste, the effect of the diluent on dyestuff and fibre material, the fixation conditions, the action of agents and conditions during the aftertreatment and the like have to be observed carefully. These possibilities of action do not exist when dyeing with acetate rayon dyestuffs from aqueous solution.

Thus, the printer has to find a process for the printing of textile material made of polyester fibres which, when using dispersion dyestuffs under the normal conditions of printing in a simple fixation reaction, leads to the tints, depth of shade and good stability normally shown by these dyestuffs since by means of the named dyestuff class there are only obtained unsatisfactory results when employing the usual conditions of the steaming process. Here it has to be taken into consideration that during the washing process, which is necessary after printing and which is advantageously carried out at elevated temperatures for elimination of chemicals, thickening agents and unfixed dyestuff, the dyestuffs should not bleed and contaminate unprinted accompanying material or spots printed in other colours.

Now we have found that, when printing textile material made of or containing fibrous material, especially of the type of linear polyesters on the base of aromatic

dicarboxylic acids, for instance, polyethylene glycol terephthalate fibres, good results are obtained by means of dispersion dyestuffs in the following way: The material is printed with a printing paste containing one or several polyhydric alcohols or one or several derivatives of the same, if desired, in admixture with each other, is dried and exposed to the action of high temperatures.

As polyhydric alcohols there are used especially bi- or trihydric alcohols, such as glycol, glycerol, 1.3- and 1.4-butanediol, 2-ethylhexanediol, 1.3.5-hexanetriol, pentaerythrite, furthermore, monosaccharides and their anhydro compounds, such as sorbitol, sorbitan and the like.

As derivatives of polyhydric alcohols may, for instance, be mentioned the ethers of polyhydric alcohols, which may be formed from uniform alcohols, for example, the glycol ethers such as diglycol, triglycol and especially tetraglycol, pentaglycol etc. The ethers may also be obtained by combination of two different polyhydric alcohols, for example, glycol and glycerol. There are also suitable such ethers as are formed by combination of a polyhydric alcohol with a monohydric alcohol, especially the products derived from glycol or its ethers, for example, the methyl, ethyl, butyl and above all the dodecyl or octadecyl ether of glycol, tri-, tetra- or pentaglycol. Instead of the simple monohydric alcohols there may also be used for etherification basic alcohols, such as monoethanol-amine, di-, triethanol-amine. Cycloaliphatic alcohols, such as cyclohexanol, may also be used for preparation of the etherification products of the polyhydric alcohols. In addition, etherification products on the basis of phenols are also suitable.

Products on the basis of polyhydroxy-propylene which are oxethylated at the two chain ends with about 2 to 6 mols of ethylene oxide each (Pluronics) are also of advantage. There come also into consideration condensation products from alkylene oxides and compounds containing reactive hydrogen atoms, for example, fatty acid amides, fatty amines, mercaptans, carboxylic acids etc.

As far as the above mentioned etherification products of polyhydric alcohols still contain free hydroxy groups, they can just as well be esterified with acids as the polyhydric alcohols themselves. These compounds which are distinguished by their superior solubility can likewise successfully be employed in the process of the present invention. Inorganic as well as organic acids may be used for the esterification. There may be mentioned, for example: sulphuric acid, orthophosphoric acid, pyrophosphoric acid, as well as condensed polyphosphates which are still esterifiable as are obtained according to the process of British Patent No. 706,410, boric acid, aliphatic and aromatic mono- and dicarboxylic acids, such as fatty acids, especially higher molecular fatty acids, such as lauric acid, palmitic acid, oleic acid, stearic acid, benzoic acid, salicylic acid, phthalic acid, phenoxyacetic acid and the like. As compounds coming into consideration, which can be obtained from the aforementioned or similar components, there may for example be mentioned: glycol carbonate, glycol sulfite, glycol chlorhydrin, benzoic acid diglycol ester, benzoic acid tetraglycol ester, stearic acid glycol ester, lauric acid diglycol ester, the secondary ester from orthophosphoric acid and octadecyl tetraglycol, the corresponding primary ester, dodecyl diglycol sulphuric acid ester and the like. The compounds used according to the process of the present invention are incorporated in the printing pastes. On printing, the fabric is dried in known manner at temperatures below 100° C., and the dyestuff is fixed by heating to elevated temperatures. There are applied temperatures between about 140° C. and 200° C. The time of heating depends on the temperature and can vary between fractions of a minute

and several minutes. In the case of fabrics made of polyethylene glycol terephthalate fibres, it has proved of advantage to heat for about 30 seconds to 180° C.–200° C. At lower temperatures, for example, at 140° C.–160° C., a time of heating of about 1–3 minutes normally suffices, which, however, does not exclude the extension of the time of heating in certain cases to about 5 to 10 minutes in order to obtain special effects. After the heating process, the printed fabric is rinsed, soaped at an elevated temperature between about 50° C. and about 80° C., rinsed and finished in the usual manner.

The process of the present invention is not only applicable to condensation products from polyvalent acids and polyhydric alcohols, especially of the type of the polyethylene glycol terephthalate, usually called polyester fibres, but by polyesters there are also meant in the present case fabrics composed of cellulose triacetate fibres.

As regards the marked chemical differences between the structures of the dyestuffs even within an assortment considered as a unit from a coloristic point of view, such as the group of the dispersion dyestuffs, and in view of the different action exerted by the diluents contained in the printing paste on the fixation of the dyestuffs, no generally applicable rule can be set up for the selection of the polyhydric alcohols and the derivatives thereof being used according to the present invention and for the most suitable proportions. In addition, this is not possible because the variations in the fixation, the time and action of temperature, which are adapted to the practical purposes of use, are of considerable importance. In some cases complete levelness of the print need not be considered and the best utilisation of dyestuff will be the chief aim instead. This applies, for instance, when printing small patterns. If, however, greatest demands are made on the levelness in the case of blotch prints, a far-reaching utilisation of the dyestuffs will sometimes be dispensed with. In other cases an especially good penetration of print will be that what matters. In this case the most favourable range of action dependent on the required effects can be obtained by variation of the alcohols or derivatives thereof coming into consideration. As regards the utilisation of dyestuff and the levelness of the prints with dispersion dyestuffs on polyester fibres, the tertiary orthophosphate of the polyglycol ester which has a mean molecular weight of about 200, has proved to be particularly effective and superior to the corresponding polyglycol. By afteresterification of the mentioned phosphate with higher molecular fatty acids, for example, with 1 to 3 mols of stearic acid, the effect and, above all, the smoothness of the printing colour can be improved. The oxethylation products of the higher fatty alcohols show a similar behaviour. Beside levelness, utilisation of dyestuff and the advantage of the high solubility, a good penetration of print and a high lustre of the coloration becomes evident if the products are subsequently esterified with acids. Instead of the named compounds, which contain the radical of a high fatty alcohol, there may also be used the corresponding reaction products of alkyl phenols, for example, butyl phenols or naphthols or other substituted phenols. Whilst by the usual steaming of the printed and dried material on the star steamer or on the Mather and Platt ager only a very weak print effect is obtained, the action of dry heat leads to excellent effects, especially if products are used which show a lower oxethylation degree (about 3 to 4 mols of ethylene oxide). By further esterification of the products, which still contain a hydroxy group, with acids a further possibility for variation is given so that by the appropriate choice of products the most different requirements can be met. As far as the above mentioned derivatives have surface-active properties, i.e. especially an emulsifying and dispersing action on other substances, they can be combined with greatest advantage with known carriers, which are normally insoluble and only distribute with difficulty in the printing paste. By carriers there are understood in this case substances which facilitate the penetration of the dyestuffs into the polyester fibre. In the dyeing technique these substances are of great importance. There may, for instance, be mentioned; salicylic acid, ortho- and para-phenylphenol, monochlorobenzene, chloronaphthalene, alkyl or aryl benzoate, for example, methyl, phenyl, benzyl benzoate and the like. A very effective carrier for printing can, for instance, be developed by combination of the water-insoluble benzyl benzoate with the octaglycol ether of the oleyl alcohol. The same applies, for example, to the combination from 2-naphthyl benzoate and tetraline. The mentioned oleyloctaglycol ether acts for both products as a very good dispersing agent. The action of other auxiliaries can also be intensified by the surface-active compounds found to be suitable for the process of the present invention. This applies, for instance, to the use of higher molecular alcohols of the fatty series or their simple esters, such as the lauryl alcohol or the primary esters of this alcohol with orthophosphoric acid which are only with difficulty dispersed homogeneously in the printing paste. By addition of the primary ester of orthophosphoric acid with octadecylpentaglycol, for instance, the printing paste is obtained, after drying, in a very soft and elastic state, whilst without the use of such auxiliaries the dyestuff easily cracks off so that there is a risk that during fixing at high temperatures cracked off dyestuff particles are fixed on other spots. This risk can be eliminated by means of the substances used according to the present invention. Other auxiliaries can also be distributed in a completely homogeneous manner in the aqueous printing paste by the use of the substances applied according to the present invention. As such auxiliaries there may, for example, be mentioned: ketones such as acetophenone; aldehydes such as benzaldehyde, salicylaldehyde; acids and their esters such as benzoic acid and the already mentioned esters; amines such as methylbenzyl aniline, chloraniline, β-naphthyl amine; furthermore β-naphthol.

When printed with dispersion dyestuffs, fibrous material composed of cellulose triacetate behaves in a similar way as fabrics made of polyester fibres of the type of the linear polyesters on the basis of aromatic dicarboxylic acids, for instance, of the polyethylene glycol terephthalate. On this material the dyestuff can only be fixed very difficultly by means of the usual steaming process. However, excellent results are obtained if the above mentioned polyhydric alcohols or their derivatives are added to the dyestuffs. For fixing the dyestuffs a simple thermic treatment is applied at high temperatures between about 150° C. and 250° C. at a time of heating ranging between about ½ and about 5 and more minutes.

The analogous behaviour of the cellulose triacetate seems to be based on the fact that, in spite of the differences in the chemical structure, the molecule contains numerous ester groups.

The following examples serve to illustrate the invention but they are not intended to limit it thereto:

Example 1

30 parts of 1-amino-2-methoxy-4-hydroxyanthraquinone are stirred with 50 parts of thiodiglycol and 370 parts of water of 70° C. and are mixed with 500 parts of a thickening which consists of equal parts of British gum (1:1) and crystal gum (1:2). There are then added 50 parts of the primary phosphoric acid ester of the condensation product obtained from dodecyl alcohol and 4 mols of ethylene oxide and the whole is carefully mixed up. A fabric made of polyethylene glycol terephthalate fibres is printed with the paste obtained, is dried in the usual manner, heated for 30 seconds to 200° C., rinsed, soaped at 70° C., rinsed once more and finished as usual. A print is obtained showing a much greater intensity of colour than without addition of the named phosphate.

Instead of the primary ester of the phosphoric acid with

the above mentioned condensation product there can also be used with equal success the same quantity of the primary phosphoric acid ester of the condensation product obtained from dodecyl alcohol and 8 mols of ethylene oxide or palmityl alcohol and 5 mols of ethylene oxide.

Example 2

30 parts of 1.4-diamino-2-methoxy-anthraquinone are made into a paste with 50 parts of thiodiglycol and 370 parts of water of 70° C. and the paste is mixed with 600 parts of a tragacanth thickening (60:1000). Into this paste are stirred 50 parts of the tertiary phosphoric acid ester of a polyethylene glycol having a mean molecular weight of 200.

A fabric made of polyethylene glycol terephthalate fibres is printed in the usual manner with the printing paste obtained either on the cylinder printing machine or screen printing machine, dried, heated for 30 seconds to 180° C., rinsed, soaped at 70° C. and rinsed once more. The penetration of print is considerably improved by the addition of the mentioned tertiary phosphoric acid ester. Instead of the tertiary phosphoric acid ester there may also be used the polyethylene glycol having a mean molecular weight of 200. However, the effect is then somewhat weaker.

Example 3

25 parts of 4-nitro-4'-phenylaminoazobenzene are made into a paste with 50 parts of thioglycol and introduced into 375 parts of water of 70° C. To the dyestuff dispersion there are added 500 parts of a thickening consisting of equal parts of British gum (1:1) and crystal gum (1:2) and also 50 parts of the tertiary phosphoric acid ester of a polyethylene glycol having a mean molecular weight of 200 and being subsequently esterified with 3 mols of stearic acid.

A fabric made of polyester fibres is printed with this paste, dried, heated for 1 minute to 160° C., rinsed, soaped and finished as usual. The print obtained in this manner is distinguished, as compared with a print prepared without addition of the mentioned glycol derivative, by a superior lustre of the colour. Instead of the tertiary polyethylene glycol phosphoric acid ester subsequently esterified with 3 mols of stearic acid there may also be used a product subsequently esterified with 3 mols of lauric acid or palmitic acid.

Example 4

30 parts of 1.4-diaminoanthraquinone are made into a printing paste in the manner as described in Example 1 and with the use of 50 parts of the primary phosphoric acid ester of the condensation product obtained from dodecyl alcohol and 8 mols of ethylene oxide. The paste is then printed onto a polyethylene glycol terephthalate fabric and dried. Thereupon, the fabric is heated for 30 seconds to 220° C. and finished as described in Example 1. The print obtained is more level and more brilliant than a print prepared without the use of the mentioned phosphoric acid ester. Instead of the primary phosphoric acid ester of the condensation product obtained from dodecyl alcohol and 8 mols of ethylene oxide there may also be used the secondary phosphoric acid ester of the condensation product obtained from myristyl alcohol and 6 or 4 mols of ethylene oxide or the primary phosphoric acid ester of the condensation product obtained from oleyl alcohol and 10 mols of ethylene oxide.

Example 5

25 parts of 1.4-diamino-2-methoxy-anthraquinone are made into a paste with 50 parts of thiodiglycol and are stirred up with 355 parts of water of 70° C. Upon addition of 550 parts of crystal gum (1:2) there are added 40 parts of the primary phosphoric acid ester of the condensation product prepared from dodecyl alcohol and 4 mols of ethylene oxide and the paste is carefully stirred up. The fabric made of polyethylene glycol terephthalate fibres is printed with this printing paste, dried, heated for 30 seconds to 200° C. and finished in the usual manner. The print shows a penetration and levelness that is much superior to that of a print prepared without addition of the mentioned phosphoric acid ester.

If a printing paste is used which contains 30 parts of dyestuff and, instead of the quoted quantity of crystal gum, 500 parts of British gum (1:1) as thickening agent and also 50 parts of the mentioned ester, the same result is obtained if the printed and dried polyester fabric is heated for 2 minutes at 150° C.

Example 6

30 parts of 4-nitro-4'-phenylamino-azobenzene are made into a paste with 30 parts of thiodiglycol and stirred up with 340 parts of water of 70° C. Upon addition of 550 parts of the thickening described in Example 1 there are carefully introduced into the paste obtained, while stirring, 50 parts of a tertiary phosphoric acid ester of a polyethylene glycol having a mean molecular weight of 200 and being subsequently esterified with 2 mols of stearic acid, oleic acid, plamitic acid or lauric acid. A fabric made of polyethylene glycol terephthalate fibres is printed with this printing paste, dried, heated for 30 seconds at 180° C. and finished in the usual manner by soaping and rinsing. As compared with a print prepared without addition of the mentioned phosphoric acid ester, the print obtained according to the process of the present invention is much more intense, completely level and very brilliant.

Example 7

30 parts of 1.4-diamino-nitroanthraquinone, 30 parts of thiodiglycol, 290 parts of water of 70° C. and 600 parts of tragacanth (60:1000) are made into a paste into which are also incorporated 50 parts of the primary phosphoric acid ester of the condensation product obtained from octadecyl alcohol and 4 mols of ethylene oxide. A fabric made of polyethylene glycol terephthalate fibres is printed with the paste thus obtained, dried, heated for 2 minutes at 140° C. and finished in the usual manner. The print obtained shows a levelness and intensity that is superior to that of a print prepared without the use of the mentioned phosphoric acid ester. Instead of the named primary phosphoric acid ester there may also be used equal quantities of the following compounds:

(1) The primary or tertiary phosphoric acid ester of the condensation product obtained from dodecyl alcohol and 4 or 8 mols of ethylene oxide;

(2) The primary or secondary phosphoric acid ester of the condensation product obtained from octadecyl alcohol and 16 mols of ethylene oxide;

(3) The tertiary phosphoric acid ester of the condensation product obtained from stearyl or oleyl alcohol and 4 mols of ethylene oxide;

(4) The secondary phosphoric acid ester of the condensation product obtained from dodecyl alcohol and 4 mols of ethylene oxide;

(5) The tertiary phosphoric acid ester from polyethylene glycol having a mean molecular weight of 200;

(6) The tertiary phosphoric acid ester from polyethylene glycol having a mean molecular weight of 200 and being subsequently esterified with 2 mols of stearic acid or palmitic acid;

(7) The tertiary phosphoric acid ester from polyethylene glycol having a mean molecular weight of 200 and being subsequently esterified with 3 mols of stearic acid or oleic acid;

(8) The secondary phosphoric acid ester of the condensation product obtained from oleyl alcohol and 2 mols of ethylene oxide;

(9) The dibenzoic acid diglycol ester;

(10) The salicylic acid tetraglycol ester;

(11) The phthalic acid diglycol ester;

(12) The benzoic acid tetraglycol ester;

(13) The condensation product obtained from para-

butyl phenol or β-naphthol and 1 or 2 mols of ethylene oxide.

Example 8

20 parts of 1.4-diamino-5-nitroanthraquinone, 50 parts of thiodiglycol, 290 parts of water of 70° C., 600 parts of locust bean flour thickening 25:1000 and 40 parts of the secondary phosphoric acid ester of the condensation product obtained from octadecyl alcohol and 16 mols of ethylene oxide are made into a paste in the usual manner. A fabric made of polyethylene glycol terephthalate fibres is printed with this paste and dried. Upon drying the fabric is heated for 40 seconds to 180° C. and finished in the usual manner.

An equally good result is obtained if there are used 30 parts of dyestuff and, instead of the named secondary phosphoric acid ester, 50 parts of polyglycol (mean molecular weight 200).

Example 9

25 parts of para-nitro-amino-azobenzene are stirred up with 40 parts of thiodiglycol and 335 parts of water of 70° C. and are then mixed with 550 parts of starch-tragacanth thickening. To this mixture there are added 50 parts of the secondary phosphoric acid ester of the condensation product obtained from oleyl alcohol and 2 mols of ethylene oxide and the whole is stirred well while heating on the water bath. A fabric made of polyethylene glycol terephthalate fibres printed with this paste, which was dried, heated for 30 seconds at 280° C. and finished in known manner, showed excellent levelness and intensity.

Example 10

30 parts of a dyestuff obtained by diazotisation of amino-azobenzene and coupling with ortho-cresol are made up, in the manner described in Example 1, to a printing paste which instead of the quoted quantity of the phosphoric acid ester, contains the same amount of dibenzoic acid diglycol ester. Upon printing a fabric made of polyethylene glycol terephthalate fibres, fixing the dyestuff by heating for 30 seconds at 200° C. and finishing in known manner, a very even and intense print is obtained.

Example 11

30 parts of 1.4-diamino-2-methoxy-anthraquinone, 50 parts of thiodiglycol and 370 parts of water of 70° are made into a paste and stirred well. After heating with 500 parts of a polyvinyl alcohol thickening which still contains 12 percent of acetyl groups, there are incorporated into the mass 50 parts of the condensation product obtained from para-butyl-phenol and 2 mols of ethylene oxide. A fabric made of polyethylene glycol terephthalate fibres is printed with this paste, dried, heated for 30 seconds at 180° C. and finished in known manner. A print is obtained which is distinguished by an excellent lustre, very good levelness and good penetration.

Example 12

30 parts of dyestuff obtained by diazotisation of ortho-para-nitraniline and coupling with dihydroxy-ethyl-meta-toluidene are mixed with 50 parts of thiodiglycol and 370 parts of water of 70° C. After mixing with 500 parts of tragacanth thickening (60:1000) there are incorporated into the mass obtained 50 parts of a condensation product obtained from para-butylphenol and 1 mol of ethylene oxide. A fabric made of polyethylene glycol terephthalate fibres is printed with this paste, dried, heated for 1 minute at 150° C., rinsed, soaped at 70° C., rinsed once more and treated in known manner. A very good penetration of print is obtained.

Example 13

30 parts of the dyestuff obtained by diazotisation of para-nitraniline and coupling with dihydroxyethyl-meta-chloraniline are made into a paste with 50 parts of thiodiglycol in 370 parts of water and stirred. Upon mixing with 500 parts of a starch-tragacanth thickening, there are added 50 parts of a condensation product obtained from tributylphenol and 4 mols of ethylene oxide and the mass is carefully stirred up while heating on the water bath. A fabric made of polyethylene glycol terephthalate fibres is printed with this paste, dried, heated for 40 seconds at 180° C. in order to fix the dyestuff, and finished in known manner. As compared with a print prepared without use of the condensation product from tributylphenol and ethylene oxide, the print thus obtained is distinguished by its superior lustre.

Example 14

30 parts of 4-nitro-4'-phenyl-amino-azobenzene are stirred up with 40 parts of thiodiglycol and 280 parts of water of 70° C. To this dyestuff dispersion are added, as thickening agent (1:4), 600 parts of a polyvinyl alcohol still containing 12 percent of acetyl groups. Into the mass are then incorporated, while warming on the water bath, 50 parts of the tertiary phosphoric acid ester of a polyethylene glycol having a mean molecular weight of 200, which has been esterified with 2 mols of stearic acid. A fabric made of polyethylene glycol terephthalate fibres is printed with this printing paste, dried and heated for 1 minute at 160° C. After processing in known manner a print is obtained which is distinguished by good levelness and intensity.

Example 15

30 parts of 1.4-diamino-5-nitro-anthraquinone are made into a paste with 30 parts of thiodiglycol, stirred up with 360 parts of water of 70° C. and mixed with 500 parts of a thickening consisting of equal parts of British gum (1:1) and crystal gum (1:2). While warming on the water bath there are incorporated into the paste 60 parts of a condensation product obtained from para-butylphenol and 2 mols of ethylene oxide.

A fabric made of cellulose triacetate is printed with this printing paste, dried and heated for 2 minutes at 220° C. The fabric thus obtained is rinsed, soaped at 70° C. and rinsed once more. A print is obtained which is distinguished by an excellent intensity and lustre.

In the described manner there can also be obtained plain colours by printing one or both sides of the fabric with one of the described printing pastes, for example, by means of a hatching printing roller or a blotch roller, or by impregnating the fabric with the printing paste, drying and developing in the heat.

We claim:

1. A process for printing textile material comprising a member of the group consisting of cellulose triacetate fibers and linear aromatic dicarboxylic acid polyester fibers with a dispersion dyestuff which comprises printing said material with said dyestuff and a compound of the group consisting of (A) a phosphoric acid ester of a polyethylene glycol, (B) a phosphoric acid ester of a condensation product of a polyethylene glycol and an aliphatic monohydric alcohol having from twelve to eighteen carbon atoms, and (C) a phosphoric acid ester of a polyethylene glycol that is esterified with an aliphatic carboxylic acid having from twelve to eighteen carbon atoms, drying the printed material and subjecting it to a temperature of about 140 to about 220° C.

2. A process as defined in claim 1 wherein the phosphoric acid ester of a polyethylene glycol is a phosphoric acid tetraethylene glycol ester.

3. A process as defined in claim 1 wherein the phosphoric acid ester of a polyethylene glycol is a phosphoric acid pentaethylene glycol ester.

4. A process as defined in claim 1 wherein the phosphoric acid ester of a polyethylene glycol that is esterified with an aliphatic carboxylic acid is a phosphoric acid tetraethylene glycol ester esterified with lauric acid.

5. A process as defined in claim 1 wherein the phosphoric acid ester of a polyethylene glycol that is esteri-

fied with an aliphatic carboxylic acid is a phosphoric acid, tetraethylene glycol ester esterified with stearic acid.

6. A process as defined in claim 1 wherein the phosphoric acid ester of a polyethylene glycol that is esterified with an aliphatic carboxylic acid is a phosphoric acid tetraethylene glycol ester esterified with oleic acid.

7. A process as defined in claim 1 wherein the phosphoric acid ester of a polyethylene glycol that is esterified with an aliphatic carboxylic acid is a phosphoric acid pentaethylene glycol ester esterified with lauric acid.

8. A process as defined in claim 1 wherein the phosphoric acid ester of a polyethylene glycol that is esterified with an aliphatic carboxylic acid is a phosphoric acid pentaethylene glycol ester esterified with stearic acid.

9. A process as defined in claim 1 wherein the phosphoric acid ester of a polyethylene glycol that is esterified with an aliphatic carboxylic acid is a phosphoric acid pentaethylene glycol ester esterified with oleic acid.

10. A process as defined in claim 1 wherein the phosphoric acid ester of a condensation product of a polyethylene glycol and an alcohol is a phosphoric acid ester of a condensate of a polyethylene glycol having a mean molecular weight of up to 250 with dodecyl alcohol.

11. A process as defined in claim 1 wherein the phosphoric acid ester of a condensation product of a polyethylene glycol and an alcohol is a phosphoric acid ester of a condensate of a polyethylene glycol having a mean molecular weight of up to 250 with oleyl alcohol.

12. A textile material printed by the process defined in claim 1.

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