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(54) Titre : MOUSSES HYDROPHILES POLYESTER-POLYURETHANE, PROCEDE DE PRODUCTION ET LEUR
UTILISATION COMME MATIERES ABSORBANT L'HUMIDITE
(54) Title: HYDROPHILIC POLYESTER-POLYURETHANE FOAMS, A PROCESS FOR THEIR PRODUCTION, AND
THEIR USE AS MOISTURE-ABSORBING MATERIALS

(57) **Abrégé/Abstract:**

A process for the production of hydrophilic polyester-polyurethane foams is described. This process is characterized by reacting a) one or more polyisocyanates, with b) one or more polyester polyols containing at least two hydroxyl groups and having a mean molecular weight in the range from 400 to 10,000, c) one or more ethoxylated polyether polyols containing at least two hydroxyl groups and having a degree of ethoxylation of more than 30% by weight and a functionality in the range from 2 to 6, and d) optionally, one or more chain extenders and/or crosslinking agents which contain at least two active hydrogen atoms and having a mean molecular weight in the range from 32 to less than 400, in the presence of e) catalysts, water and/or blowing agents, and f) optionally auxiliary substances and additives. The use of these hydrophilic polyester-polyurethane foams as moisture-absorbing materials in the hygiene and domestic sector, as well as for automobile interior finishes is also described.



Hydrophilic polyester-polyurethane foams, a process for their production, and their use as moisture-absorbing materials

ABSTRACT OF THE DISCLOSURE

A process for the production of hydrophilic polyester-polyurethane foams is described. This process is characterized by reacting

a) one or more polyisocyanates,

with

b) one or more polyester polyols containing at least two hydroxyl groups and having a mean molecular weight in the range from 400 to 10,000,

c) one or more ethoxylated polyether polyols containing at least two hydroxyl groups and having a degree of ethoxylation of more than 30% by weight and a functionality in the range from 2 to 6,

and

d) optionally, one or more chain extenders and/or crosslinking agents which contain at least two active hydrogen atoms and having a mean molecular weight in the range from 32 to less than 400,

in the presence of

e) catalysts, water and/or blowing agents,

and

f) optionally auxiliary substances and additives.

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The use of these hydrophilic polyester-polyurethane foams as moisture-absorbing materials in the hygiene and domestic sector, as well as for automobile interior finishes is also described.

Hydrophilic polyester-polyurethane foams, a process for their production, and their use as moisture-absorbing materials

BACKGROUND OF THE INVENTION

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The present invention relates to hydrophilic polyester foams, a process for their production, and to their use as moisture-absorbing materials in, for example, the domestic, hygiene and/or automobile sectors.

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In the production of polyether-polyurethane (PUR) or polyester-PUR flexible foams according to the one-stage ("one shot") process, which is the most widely employed commercial process for slabstock foam production, foams are formed that exhibit only insufficient hydrophilic properties, even when these foams are characterized by a significant amount of open-cells.

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In this connection, there has been no shortage of attempts to alter the rather hydrophobic character of conventional slabstock foams so as to make them more hydrophilic. Such attempts include, for example, by post-treatment of the foam matrix or by joint foaming of wetting agents or ionic surfactants as is described in, for example, DE-A 2,207,356.

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Instead of carrying out expensive and complicated post-treatment of foams to improve their hydrophilic character, attempts have similarly been made to improve the hydrophilic properties, principally by joint foaming of hydrophilic additives per se, in a "one shot" process. Such additives include, for example, cellulose derivatives such as, for example, cellulose esters, methyl cellulose, carboxymethyl- and hydroxyethyl-cellulose, etc, as well as amino acid derivatives and sulfonic acid derivatives, betaines, lactones and ethoxylation products of glycols or related starting materials. These are described in, for example, DE-A-2,207,361, and U.S. Patents 3,413,245 and 3,806,474.

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Propoxylation and ethoxylation products of polyhydric alcohols are suitable starting materials for the production of polyether-PUR flexible foams. These polyether-PURs can be produced by reacting these raw materials, generally termed polyether polyols (normally trifunctional compounds for flexible foam applications), with diisocyanates in the presence of water (for the blowing reaction), specific polyether polysiloxanes and further auxiliary substances. Conventional polyether polyols in the above context (standard polyols) basically contain the propoxylation product of trifunctional starters together with a small amount (0-20%) of ethoxylation product in the polyol.

Polyether polyols having a higher degree of ethoxylation (i.e., above about 30%) are special polyols that are often no longer miscible with the standard polyols. These special polyether polyols generally cause foaming difficulties, particularly with increasing degrees of ethoxylation, and not the least on account of their noticeably increased reactivity.

Polyether polyols with a high degree of ethoxylation of about 50-98% by weight such as, for example, the polyol VP PU 41WB01 (Bayer AG), can only be reacted in strictly limited quantitative ratios with standard polyether polyols to form polyether foams. These result in a softening of the matrix, and form so-called hypersoft foams.

The addition of pure ethylene oxide polymers is also possible (e.g., PEG 200 to PEG 600 of Hoechst AG), though with a substantially reduced proportion of about 2-15% of the standard polyether polyol. Likewise, these result in a marked softening of the resultant polyether foam matrix.

Similarly, the joint foaming of polyether diols mixed with standard polyether polyol is also described in, for example, BE-A 707,412. According to this disclosure, predetermined polyoxyethylene glycols of various molecular weights in the range of the products PEG 600 to PEG 2000 (Hoechst AG) are propoxylated in a separate stage in order to bring the reactivity of the resulting polyether diols into a range that is compatible for foaming with standard polyether polyols. As used herein, standard polyether polyols are those polyether polyols which contain secondary OH terminal

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groups due to propoxylation, instead of primary OH terminal groups due to ethoxylation.

5 The direct foaming of pure polyoxyethylene glycols or at least of polyols with a high degree of ethoxylation and a high proportion of primary OH terminal groups such as, for example VP PU 41WB01, VP PU 3170 (both from Bayer AG) or Voranol*1421 (DOW Chemical) in the "one shot" process according to ether formulations without mixing with standard polyether polyols has not hitherto been possible. One of the reasons for this is that the reactivity of such highly ethoxylated polyols is no longer
10 controllable.

The foaming of pure polyoxyethylene glycols in conventional plants has hitherto been possible only via the intermediate step of prepolymeriza-tion. Moreover, a specific product family of prepolymers (e.g., Hypol* polymers produced by W.R. Grace Ltd.)
15 exists as a special range of products for various applications with the corresponding process technology disadvantages.

The production of hydrophilically adjusted polyester-PUR foams of relatively high density ($> 50 \text{ kg/m}^3$) is described in, for example, U.S. Patent 3,806,474. These
20 polyester-PUR foams comprise prepolymerized polyoxyethylene diols in a molecular weight range from 500 to 2000, in a conventional ester formulation, with special surfactants for emulsification and stabilization purposes.

Polyester-PUR foams are preferably used as domestic sponges since their sponge
25 structure and handling characteristics are significantly better and can more readily simulate the properties of natural sponges than is the case with the homologous polyether-PUR foams. In addition, polyester-PUR foams have, in comparison to polyether-PUR foams of the same density, superior properties with regard to tensile strength and elongation at break. Properties such as these are important for their use
30 as domestic sponges and related applications.

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Thus, the object of the present invention is to provide a process according to which hydrophilic polyester-PUR foams can be produced, preferably via a "one shot" process, without the use of propoxylated or prepolymerized polyoxyethylene diol components, and without the addition of special emulsifying agents.

5

Surprisingly, this object was achieved by a process in which hydrophilic PUR foams having the properties of polyester-PUR foams are produced by mixing commercially available, highly ethoxylated polyether polyols which have a degree of ethoxylation of more than 30% by weight, with conventional polyester polyols according to typical ester formulations.

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SUMMARY OF THE INVENTION

The present invention thus provides a process for the production of hydrophilic polyester-PUR foams, comprising reacting

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a) one or more polyisocyanates, with

b) one or more polyester polyols containing at least two hydroxyl groups and having a mean molecular weight in the range from 400 to 10,000,

20

and

c) one or more ethoxylated polyether polyols containing at least two hydroxyl groups, preferably having a functionality in the range of from 2 to 6, and having a degree of ethoxylation of more than 30% by weight,

25

and, optionally,

d) one or more components, for example chain extenders and/or crosslinking agents, containing at least two active hydrogen atoms and having a mean molecular weight in the range from 32 to less than 400,

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in the presence of

e) catalysts, water and/or blowing agents,

5

and, optionally,

f) auxiliary substances and/or additives.

10 The degree of ethoxylation of the polyether polyols which are suitable for the present invention is typically above 30% by weight, preferably between 50 and 95% by weight (based on 100% by weight of alkoxylation of the polyether polyol). Generally speaking, polyether polyols started on trimethylol propane and/or glycerol are used as the highly ethoxylated polyether polyols of the present invention. It is preferred that
15 glycerol-started highly ethoxylated polyether polyols are used.

The quantity of highly ethoxylated polyether polyols required in the present process is generally between 2 to 80% by weight, based on the total weight of components b), c) and d).

20

For the foaming reaction, about 2% to 80% of the previously described highly ethoxylated polyether polyols such as, for example, VP PU 41WB01 (a trifunctional polyether polyol from Bayer AG), appropriately mixed with conventional polyester polyols, are used.

25

Suitable polyester polyols can be produced from organic dicarboxylic acids with 2 to 12 carbon atoms and polyhydric alcohols by condensation.

Some examples of suitable dicarboxylic acids for the production of polyester polyols
30 include compounds such as succinic acid, glutaric acid, adipic acid, etc. and mixtures thereof. The corresponding dicarboxylic acid mixtures are preferably used. Aromatic dicarboxylic acids such as orthophthalic or terephthalic acid and/or unsaturated

carboxylic acids such as maleic acid and fumaric acid can also be used to form the polyester polyols of the present invention.

Suitable polyhydric alcohols which act as condensation partners for the dicarboxylic acids to produce polyester polyols include polyhydric compounds which, in general, contain from 2 to 12 carbon atoms. Particularly preferred in this connection are dihydric alcohols (i.e., glycols) from the range comprising ethylene glycol up to 1,6-hexanediol, as well as diethylene glycol and dipropylene glycol. Small amounts of glycerol, trimethylol propane or higher functional homologues are often used in conjunction with the polyhydric compounds described above, as higher functional alcohol components having a branching action.

Polyester polyols such as Desmophen*2200, Desmophen*2300 or VP PU 60WB01 (all available from Bayer AG) are preferably used. These polyols are condensation products of adipic acid, diethylene glycol and some trimethylolpropane as branching component. VP PU 60WB01 additionally is treated to "defog" it (see US Patent 5 286 761).

Suitable ethoxylated polyether polyols for the present invention include those compounds in which the degree of ethoxylation is above 30% by weight, and preferably between 50% and 95% by weight (based on 100% by weight of alkoxylation). These ethoxylated polyether polyols contain at least two hydroxyl groups, and preferably have a functionality of from 2 to 6. Suitable compounds include, for example, highly ethoxylated polyether diols (difunctional compounds), highly ethoxylated polyether triols such as, for example, VP PU 41WB01 (a trifunctional compound with mean molecular weight of 4500 and degree of ethoxylation of $\geq 70\%$) and similar products, as well as higher functional highly ethoxylated polyether polyols such as VP PU 3170 (a hexafunctional compound, with mean molecular weight of 3400 and degree of ethoxylation $\geq 80\%$). Both polyols are available from Bayer AG.

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Suitable polyisocyanates for the present invention include, for example, aliphatic, cycloaliphatic, araliphatic, aromatic and heterocyclic polyisocyanates such as are described in, for example, Justus Liebigs Annalen der Chemie, 562, pp. 75 to 136, by W. Siefken. Suitable polyisocyanates include, for example, those which correspond to the formula:



in which:

n represents a number from 2 to 4, preferably 2 or 3,

and

Q represents an aliphatic hydrocarbon radical having 2 to 8 carbon atoms, preferably 6 to 10 carbon atoms; a cycloaliphatic hydrocarbon radical having 4 to 15 carbon atoms, preferably 5 to 10 carbon atoms; an aromatic hydrocarbon radical having 6 to 15 carbon atoms, preferably 6 to 13 carbon atoms; or an araliphatic hydrocarbon radical having 8 to 15 carbon atoms, preferably 8 to 13 carbon atoms.

Examples of suitable polyisocyanates include those as are described in, for example, DE-OS 2,832,253, pp. 10 to 11.

It is preferred that the polyisocyanates are those which are readily available by commercial processes. Some examples of such easily obtainable polyisocyanates include compounds such as, for example, 2,4- and 2,6-toluylene diisocyanate as well as arbitrary mixtures of these isomers ("TDI"), polyphenylpolymethylene polyisocyanates, such as are prepared by aniline-formaldehyde condensation followed by phosgenation ("crude MDI"), and polyisocyanates containing carbodiimide groups, urethane groups, allophanate groups, isocyanurate groups, urea groups or biuret groups (i.e., the so-called "modified polyisocyanates"), and, in particular, those

modified polyisocyanates that are derived from 2,4- and/or 2,6-toluylene diisocyanate and/or from 4,4- and/or 2,4-diphenylmethane diisocyanate.

5 Particularly preferred are the normally used TDI isomer mixtures T 80, T 65 and mixtures thereof.

10 Foams having densities in the range from about 20 to 80 kg/m³, which are normal for polyester-PUR foams, can be obtained in accordance with the present invention. The density range and potential applications of the polyester-PUR foams of this invention can be appropriately broadened by the co-use of additional blowing agents such as, for example, by means of liquid carbon dioxide according to the Nova Flex technique (Hennecke/-Bayer AG) and related processes, by the reduced pressure technique according to the VPF method (Prefoam AG), or other similar techniques. It is, however, particularly preferred that these polyester-PUR foams have a density in the
15 range of from about 25 to 60 kg/m³. This density range is preferred due to the fact that, on the one hand, the water absorption capacity rises with increasing density, and, on the other hand, the wetability (i.e., accessible internal surface of the foam) depends on the extent of the final open-cell character of the foam. The wetability normally falls with increasing density.

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The polyester-PUR foams produced according to the present invention exhibit hydrophilic properties. These foams are able to absorb about 10 times the amount of water, with respect to the total weight of the dry foam, within 20-25 seconds. When dry foams produced from a polyol mixture containing at least about 10% by weight, based on the combined weight of components b), c) and d), of the highly ethoxylated
25 polyether polyols described above are placed on an aqueous surface, the foam sample sinks within a few seconds. This phenomenon, which is extremely desirable for some applications, occurs without swelling of the foam matrix, until the polyol mixture used to prepare the polyester-PUR foams contains up to about 30% by weight, based on
30 the combined weight of components b), c) and d), of the highly ethoxylated polyether polyols described above. When higher proportions of highly ethoxylated polyether

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polyol are present in the polyol mixture used to produce polyester-PUR foams, the result is then, in addition, a recognizable swelling of the foam matrix.

5 Suitable amines that can be employed to catalyze the foaming reaction include those conventional amines which are known in the field of polyurethane chemistry such as, for example N-methylmorpholine, N-ethylmorpholine, trimethylamine, triethylamine and homologous trialkylamines, dimethylpiperazine, dimethylbenzylamine, N-cocomorpholine, and other known amine activators, as well as various mixtures of such amines or urea/amine combinations.

10

In accordance with the present invention, it is particularly preferred that the amine catalysts used are those that, due to their nature and quantity required, contribute as little as possible to the smell and/or to the fogging of the foams produced therefrom.

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Other auxiliary substances and/or additives may optionally be added to the foam formulation. Suitable auxiliary substances and/or additives include, for example, flame retardants, stabilizers, and/or dispersing agents, etc.

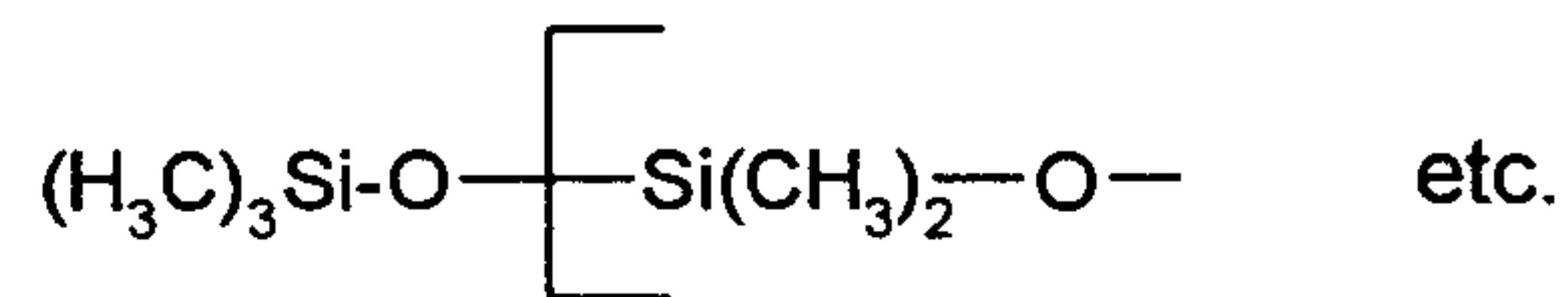
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In addition to silicone stabilizers such as, for example, SE 232 (available from OSI), VP AI 3613 and VP AI 3614 (available from Bayer AG) and/or B 8300 and B 8301 (available from Goldschmidt AG), it is possible that silicone-free surfactants or surfactant mixtures such as, for example, the combinations EM/TX or EM/PU 3240 (available from Rhein Chemie and Bayer AG), or Arcopal^{*} N 90/Genapol^{*} PF 20 (available from Hoechst AG) can be used as stabilizers.

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It is particularly preferred, however, that stabilizers are modern silicone stabilizers such as VP AI 3613, VP AI 3614 (available from Bayer AG) or B 8300 and B 8301 (available from Goldschmidt AG). Silicone stabilizers such as these result in a fine and more open-cell foam structure. In principle, these are "tailor-made" organically modified polyether-polysiloxanes based on polydimethylsiloxane. The latter can
30 simply be characterized as follows:

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A further object of the invention is a moisture-absorbing material comprising the hydrophilic polyester-PUR foams produced in accordance with the invention as described above. Moisture-absorbing materials based on these hydrophilic foams have end-use applications in areas such as, for example, the domestic and hygiene sectors. Some examples of suitable end-use applications include sponges, cleaning and/or wiping cloths, or as moisture-absorbing substrates or underlays in the hospital maintenance and domestic maintenance sector, as linings in disposable diapers, or as stripware for flame lamination or adhesive lamination with textiles or films in order to improve the moisture absorption capacity of the resultant composite materials.

In the above applications mentioned by way of example, requirements for additional properties quite often also have to be met. A particularly open-cell foam structure can be obtained by, for example, reticulation (post-treatment step to achieve maximum cell opening) of the foams.

Furthermore, the foams according to the invention may be used in a preferred variant in automobile interior finishes such as, for example, textile-covered seat and back supports.

In automobile interior applications, an essential additional aspect of these hydrophilic foams is the compliance with fogging requirements. These fogging requirements can be met by using low-fogging polyester polyols such as, for example, VP PU 60WB01 (available from Bayer AG).

In other areas of end-use applications, such as, for example, sponges and wiping cloths, the achievement of high values with respect to breaking elongation, tensile strength and tear propagation resistance are also important factors. The desired values for these properties can be achieved by, for example, the use of Desmophen 2300 (available from Bayer AG) as the polyester-polyol component.

Since a significant increase in water absorption capacity can be readily achieved by the presence of about 5% by weight of polyether polyol having a high degree of ethoxylation, hydrophilically adjusted foams can be produced that, for the most part, also exhibit the high values of "textile ester foams" based on the special polyol
5 Desmophen 2300.

Accordingly, the desired foam properties can be adjusted within a wide range by the admixture, within widely varying limits, of the highly ethoxylated polyether polyols
10 and by the possibility of using various polyester polyols for the foaming reaction.

The following examples further illustrate details for the process of this invention. The invention, which is set forth in the foregoing disclosure, is not to be limited either in spirit or scope by these examples. Those skilled in the art will readily understand that
15 known variations of the conditions of the following procedures can be used. Unless otherwise noted, all temperatures are degrees Celsius and the numerical data are parts by weight, with respect to 100 parts of polyol.

Examples

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Production of the foams:

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The following reaction components were reacted according to known and conventional processes and mechanical equipment normally used for this purpose.

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Details of the processing equipment that is used in accordance with the invention are set forth in, for example, Polyurethane Handbook, Carl Hanser-Verlag, Munich/Vienna, New York, 2nd Edition, 1993, edited by Günter Oertel, pp. 177-202.

The reaction components were intensively mixed according to the specified formulations and were then reacted.

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Example 1:

5	90 parts by wt.	VP PU 60WB01 (a low-fogging polyester polyol having an OH number of 60; available from Bayer AG)
	10 parts by wt.	VP PU 41WB01 (a trifunctional polyether polyol having a degree of ethoxylation of > 70% and an OH number of 37; available from Bayer AG)
10	4.0 parts by wt.	water
	0.25 part by wt.	Niax [*] A 30 (an amine catalyst; available from OSI)
	0.25 part by wt.	RC-A117 (an amine catalyst; available from Rhein-Chemie, Mannheim)
15	2.0 parts by wt.	VP AI3613 (a stabilizer, available from Bayer AG)
	23.8 parts by wt.	toluylene diisocyanate T 80 (a mixture of 80% by weight of 2,4-TDI and 20% by weight of 2,6-TDI)
	23.8 parts by wt.	toluylene diisocyanate T 65 (a mixture of 65% by weight of 2,4-TDI and 35% by weight of 2,6-TDI)

Example 2:

20	90 parts by wt.	DE 2300, (a polyester polyol having an OH number of 50; commercially available from Bayer AG)
	10 parts by wt.	VP PU 3170 (a hexafunctional polyether polyol having a degree of ethoxylation > 80% and an OH number of 100; available from Bayer AG)
25	3.0 parts by wt.	water
	0.2 part by wt.	Niax [*] A 30 (an amine catalyst, available from OSI)
	0.2 part by wt.	RC-A117 (an amine catalyst, available from Rhein-Chemie, Mannheim)
30	1.8 parts by wt.	VP AI 3613 (a stabilizer, available from Bayer AG)
	18.8 parts by wt.	toluylene diisocyanate T80
	18.8 parts by wt.	toluylene diisocyanate T65

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Example 3:

5	80 parts by wt.	DE 2200 (a standard polyester polyol having an OH number of 60; available from Bayer AG)
	20 parts by wt.	VP PU 41WB01 (a polyether polyol having an OH number of 37; available from Bayer AG)
	5.0 parts by wt.	water
10	1.2 parts by wt.	KST 100 (an amine catalyst, available from Goldschmidt AG)
	2.0 parts by wt.	VP AI 3613 (a stabilizer, available from Bayer AG)
	28.5 parts by wt.	toluylene diisocyanate T 80
	28.5 parts by wt.	toluylene diisocyanate T 65

Example 4:

15	50 parts by wt.	DE 2300 (a polyester polyol having an OH number of 50; available from Bayer AG)
	50 parts by wt.	VP PU 41WB01 (a polyether polyol having an OH number of 37; available from Bayer AG)
	3.0 parts by wt.	water
20	0.2 part by wt.	NiAx A 30 (an amine catalyst, available from OSI)
	0.2 part by wt.	RC-A117 (an amine catalyst, available from Rhein-Chemie, Mannheim)
	1.5 parts by wt.	SE 232 (a silicone stabilizer, available from OSI)
25	18 parts by wt.	toluylene diisocyanate T 80
	18 parts by wt.	toluylene diisocyanate T 65

Example 5:

30	20 parts by wt.	DE 2200 (a polyester polyol having an OH number of 60; available from Bayer AG)
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	80 parts by wt.	VP PU 41WB01 (a polyether polyol having an OH number of 37; available from Bayer AG)
	2.0 parts by wt.	water
	0.2 part by wt	Niax A 30 (an amine catalyst; available from OSI)
5	0.2 part by wt.	RC-A117 (an amine catalyst; available from Rhein-Chemie, Mannheim)
	1.5 parts by wt.	B 8300 (a silicone stabilizer; available from Goldschmidt AG)
	25.6 parts by wt.	toluylene diisocyanate T 65

10 **Example 6:**

	80 parts by wt.	DE 2300 (a polyester polyol having an OH number of 50; available from Bayer AG)
15	20 parts by wt.	VP PU 41WB01 (a polyether polyol having an OH number of 37; available from Bayer AG)
	3.0 parts by wt.	water
	1.0 part by wt.	KST 100 (an amine catalyst; available from Goldschmidt AG)
	2.0 parts by wt.	VP AI 3614 (a stabilizer; available from Bayer AG)
20	3.0 parts by wt.	sponge paste, consisting of 90% VP PU 41WB01 (a polyether polyol having an OH number of 37; available from Bayer AG) and 10% Loxiol G 20 (stearic acid; available from Dehydag, Düsseldorf)
	19.3 parts by wt.	toluylene diisocyanate T 80
	19.3 parts by wt.	toluylene diisocyanate T 65

25

Example 7:

	90 parts by wt.	DE 2300 (a polyester polyol having an OH number of 50; available from Bayer AG)
30	10 parts by wt.	VP PU 41WB01 (a polyether polyol having an OH number of 37; available from Bayer AG)
	3.0 parts by wt.	water

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	0.2 part by wt.	Niax A 30 (an amine catalyst; available from OSI)
	0.2 part by wt.	RC-A117 (an amine catalyst; available from Rhein-Chemie, Mannheim)
	2.0 parts by wt.	dispersing agent EM (available from Rhein-Chemie, Mannheim)
5	1.0 part by wt.	additive VP PU 3240 (available from Bayer AG)
	4.0 parts by wt.	sponge paste, consisting of 90% VP PU 41WB01 (a polyether polyol having an OH number of 37; available from Bayer AG) and 10% Loxiol G 20 (stearic acid; available from Dehydag, Düsseldorf)
10	38.0 parts by wt.	toluylene diisocyanate T 80

Determination of the hydrophilic character of the resultant foams:

15 In order to assess the hydrophilic character, the foams specified in the Examples were tested in application-specific simulation tests against a standard ester foam. The formulation of the standard ester foam was as follows:

	100 parts by wt.	Desmophen 2300
	3.0 parts by wt.	water
20	1.0 part by wt.	AI 3613
	0.2 part by wt.	Niax A 30
	0.2 part by wt.	RC A117
	36.8 parts by wt.	toluylene diisocyanate T 80

25 The tests were carried out as follows:

1. The dry foams were placed on an aqueous surface, and the hydrophilic foams produced according to Examples 1 to 7 sank completely in the water within 25 sec. By comparison, the standard foam floated for more than 1 hour on the surface of the water. When moist foams (produced in accordance with Examples 1-7 above) from which the water had been largely removed were placed on the surface of the water, the hydrophilic foams sank within 2 secs.

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The standard foam when moist, however, floated for more than 1 hour on the surface of the water.

5 2. Water droplets were applied using a wash bottle to a dry foam surface; the hydrophilically adjusted foams produced according to the present invention directly absorbed the water droplets. In the case of the standard polyester foam, however, the water droplets retained their spherical shape.

10 3. Wiping tests:

15 Water droplets were applied to a tabletop, and were directly absorbed when the tabletop was wiped with the hydrophilic foams produced according to the present invention. However, when the standard polyester foam was used to wipe the tabletop, it was necessary to wipe the tabletop several times before the droplets were absorbed by this foam.

20 Although the invention has been described in detail in the foregoing for the purpose of illustration, it is to be understood that such detail is solely for that purpose and that variations can be made therein by those skilled in the art without departing from the spirit and scope of the invention except as it may be limited by the claims.

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WHAT IS CLAIMED IS:

1. A process for the production of hydrophilic polyester-polyurethane foams comprising reacting
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a) at least one polyisocyanate,

with
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b) one or more polyester polyols containing at least two hydroxyl groups and having a mean molecular weight in the range from 400 to 10,000,

c) one or more ethoxylated polyether polyols containing at least two
15 hydroxyl groups and having a degree of ethoxylation of more than 30% by weight, based on 100% by weight of alkoxylation, and having a functionality in the range of from 2 to 6,

and, optionally,
20
d) one or more compounds containing at least two active hydrogen atoms and having a mean molecular weight in the range from 32 to less than 400,

25 in the presence of

e) one or more catalysts, water and/or blowing agents,

and, optionally,
30

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f) auxiliary substances and additives,

wherein the reaction is carried out as a one shot process.

2. The process of Claim 1, wherein said ethoxylated polyether polyols have a degree of ethoxylation of between 50 and 95% by weight, based on 100% by weight of alkoxylation.
3. The process of Claim 1, wherein said ethoxylated polyether polyols are present in an amount of from 2 to 80% by weight, based on the total weight of components b), c) and d).
4. The process of any one of claims 1 to 3, wherein said polyester polyols are based on adipic acid, diethylene glycol, trimethylol propane, glycerol, and mixtures thereof.
5. The process of any one of claims 1 to 4, wherein said reacting includes said one or more compounds d) comprising at least one of chain extenders and crosslinking agents.
6. The hydrophilic polyester-polyurethane foams produced by the process of any one of claims 1 to 5.
7. A moisture-absorbing material comprising the hydrophilic polyester-polyurethane foams produced by the process of any one of claims 1 to 5.