

AUSTRALIA
PATENTS ACT 1990

SPRUSON & FERGUSON

635852

PATENT REQUEST: STANDARD PATENT

I/We, the Applicant(s) and Nominated Person(s) specified below, request I/We be granted a patent for the invention disclosed in the accompanying standard complete specification.

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[54] Invention: Composition for Paint-Removal Coatings on Substrates

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DATED this NINTH day of JULY 1991

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Registered Patent Attorney

OUR REF: 186160

S&F CODE: 64070

5022885 09/07/91

5845/2

Australia

Patents Act 1990

NOTICE OF ENTITLEMENT

I, Carolin Beutelrock, of Untertrave 105, 2400 Lubeck, Germany, being the Applicant/Nominated Person in respect of an application entitled:

Composition for Paint-Removal Coatings on Substrates
state the following:-

The Applicant/Nominated Person has entitlement from the actual inventor(s) as follows:-

The Applicant/Nominated Person is the assignee of the actual inventor(s).

DATED this 5th day of August 19 91



Carolin Beutelrock

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(12) PATENT ABRIDGMENT (11) Document No. AU-B-80294/91
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 635852

- (54) Title
COMPOSITION FOR PAINT-REMOVAL COATINGS ON SUBSTRATES
- International Patent Classification(s)
(51)⁵ **C08L 067/00 C08K 005/00 C09D 167/00**
- (21) Application No. : **80294/91** (22) Application Date : **09.07.91**
- (43) Publication Date : **14.01.93**
- (44) Publication Date of Accepted Application : **01.04.93**
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- (57) Claim

1. A composition for paint-removal coatings on substrates, characterised in that it contains:

(a) a branched, saturated, hydroxy group-containing polyester having a hydroxyl number (mg KOH/g solid resin) of from 180 to 320, a hydroxyl content, based on the solid resin, of 6 to 10% and having an acid number of 6 as the maximum,

(b) at least one polyisocyanate,

(c) a polysiloxane modified polyisocyanate,

(d) a polyurethane curing catalyst, and

(e) at least one organic solvent.

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COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

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Invention Title: Composition for Paint-Removal Coatings on Substrates

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

Composition for Paint-Removal Coatings on Substrates

In many towns, particularly in cities, paint sprayings, so-called "graffiti", are appearing to an increasing extent on public and private buildings and also on vehicles, particularly on railways and underground railway carriages. Although, on the one hand, graffiti have developed into an art form of its own and are often desirable for improving the appearance of depressing urban concrete districts, daubs devoid of any art, which are, to be found predominantly in towns as well as social and political words, are on the other hand, to be regarded as fouling the image of the town. To remove such paint sprayings from spray guns, officialdom and house owners have to spend large sums every year in order to bring buildings and railway and underground railway carriages back to their original condition. Not only that, but because of the penetration of the sprayed paint into the surface pores of buildings, irreparable damage often occurs, which can only be removed by expensive coatings which, in turn, considerably harm the visual appearance of a building.

As a preventative measure against such foulings, wax-based coating agents are known which can be applied, for example, to the lower areas of buildings, which areas are particularly endangered by graffiti. Such coatings are to some extent paint rejecting and can be removed, together with the paint sprayings, by means of steam which softens and dissolves the coating from the substrate. A particular disadvantage of such wax-based coating agents is the fact that after removal of the graffiti the coating must be renewed, which is an expensive matter.

The task facing the invention thus consists of obtaining an improved composition for paint-removal coatings on substrates, allowing easier removal of paint sprayings, without requiring subsequent reapplication to the substrate. This task is solved by the composition in accordance with the invention.

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The composition of this invention for paint-removal coatings on substrates is characterised in that it contains:

a) a branched, saturated, hydroxyl group-containing polyester having a hydroxyl number (mg KOH/g solid resin) of 180 to 320, a hydroxyl content, based on the solid resin, of 6 to 10%, and an acid number of 6 maximum;

- 5 b) at least one polyisocyanate;
 c) a polysiloxane modified polyisocyanate;
 d) a curing catalyst for polyurethane; and
 e) at least one organic solvent.

10 From the compositions of the invention polyurethane are formed with the surprising effect of easy removability of paint sprayings, attributable, in particular, to the combination of components a) and c). The modified polyurethanes arising from the compositions of the invention bond firmly and durably to the substrate. Upon spraying with
15 paint we get a dual effect. On the one hand, the substrate accepts the paint poorly and allows the paint to coagulate to a degree and to flow off the surface, which discourages the sprayer from spraying on such surfaces from the outset. On the other hand, paint sprayings can easily be removed from coating after drying, without, at the same time
20 attacking or removing the coating itself.

The hydroxyl number preferably lies in the range 210 to 290, particularly in the range 240 to 280, the hydroxyl content in the range 7 to 9% and the acid number at 4.5 maximum.

25 So as to increase the water vapour permeability of the coating, which is of particular importance with bridge and underground constructions which come into contact with ground water, it is preferably that a part of component a) be replaced by a branched, saturated, hydroxyl group-containing polyester having a hydroxyl number
30 of 120 to less than 180 and a hydroxyl content of 3 to less than 6%, and/or by a branched, saturated, hydroxyl group-containing ^{polyether} ~~polyester~~ having a hydroxyl content of 8 to 14%. For preference 10 to 50% by wt. of component a) is replaced by the other polyester or the polyether, special preference being for 20 to 40% by wt. Through the addition of
35 such a ^{polyether} ~~polyester~~ with a lower hydroxyl content, or a polyester with a hydroxyl content in the range mentioned, the removability of paint

spraying is not adversely affected or only very slightly, while water vapour permeability is considerably increased.

If this addition component is a ^{polyester} ~~polyester~~, its hydroxyl number preferably lies at 150 to 170 and its hydroxyl content preferably at 4 to 5.5%. With the polyether, the hydroxyl content is preferably 10 to 12%. Where, in the description and claims, percentages are used in connection with the hydroxyl content, percentages by weight are meant based on the solid content of the respective polyester or polyether.

As component b), there may be used basically any of the polyisocyanates usual for polyurethanes, especially diisocyanates, but also tri- and tetraisocyanates, or pre-polymers of the same. The polyisocyanates may be of an aromatic, aromatic-aliphatic, aliphatic, or cyclo-aliphatic nature. Since the compositions of the invention are, as a rule, used in the open air, and aromatic polyisocyanates give coatings with a deficient resistance to weathering, it is better to use aliphatic polyisocyanates, particularly diisocyanates or their pre-polymers, in the compositions of the invention.

When necessary, ordinary blocked polyisocyanates can be considered. These are ordinary commercial compounds, in which, for example, the isocyanate group may be blocked by reaction with an alcohol, with caprolactam, with a phenol or with a glycol. Blocked polyisocyanates thus come into consideration if the compositions of the invention contain components a) to e) together in a uniform mixture. With unblocked polyisocyanates it is advisable to pack and to store the agent as two components, with component a) contained in one package and components b) and c) in the other.

Component c) is a polysiloxane modified polyisocyanate and may again be a di-, tri- or tetraisocyanate, but a diisocyanate is preferred and, especially one of an aliphatic nature. This is incorporated into the polyurethane by polymerisation so that the polysiloxane modification is fixed in the polyurethane polymer. Moisture hardening systems also come up for consideration, which upon exclusion of moisture are storage stable, and only harden under the



effect of atmospheric moisture.

Component d) consists of an ordinary curing catalyst for the preparation of polyurethanes. Such curing catalysts are for example, and in particular tertiary amines, quaternary ammonium salts and ester amines and also different metal compounds, such as zinc octoate or dibutyl tin dilaurate.

The organic solvent is added in sufficient an amount to provide easy handling. The individual components are, in many cases, already contained in a solvent so that such solvents automatically find their way in to the compositions of the invention with the individual components. During storage, in two separate containers, it is best that both of them contain an organic solvent. Basically all organic solvents may be considered which are inert to the polyester components and to the polyisocyanate components. Aromatic substances are preferred, such as xylene, solvent naphtha or the like, and/or esters, such as, butyl acetate, methoxypropyl acetate, ethoxyethyl acetate or ethglycol acetate, and ketones, such as methylisobutyl ketones or methylethyl ketones.

A particular favourable paint removing effect is obtained if, in addition to components a) to e), a polyester modified hydroxy functional polysiloxane is included as component f), for preference a polyester modified hydroxy functional polydimethyl siloxane. This is best added in an amount of 0.5 to 5, preferably 1 to 3, pbw per 100 pbw of component a).

The compositions of the invention may moreover contain further additives which are usual in coating agents, such as flow agents, pigments, colorants, UV absorbers or the like, provided these materials do not have a detrimental effect on the required properties of the composition.

The optimum composition by weight can be determined by a series of tests. It is advisable that the composition contains, respectively, 100pbw of component a), 50 to 120, but preferably 60 to 90 pbw of



1 to 3 pbw of component (c) and 0.01 to 1 but preferably component b), 0.5 to 5, but preferably 0.1 to 0.5 pbw of component d). As a whole, the composition of the invention, independent of whether it is present as a uniform mixture or in two separate containers, preferably contains, respectively, 100 pbw of component a), 50 to 500, preferably 100 to 250, and better still 140 to 180 pbw of component e).

The compositions of the invention may be applied to the substrates in different ways, such as, for example, by spraying, brushing on, rolling on or in any other usual manner.

Example 1

Component A

Strongly branched, saturated, hydroxyl group-containing polyester with hydroxyl number (mg KOH/g solid resin) of about 265, a hydroxyl content (based on the weight of the solid resin) of about 8% and an acid number (mg KOH/g solid resin) of 4 maximum, as a 65% solution in methoxypropyl acetate.....65.00 pbw

xylene.....17.63 pbw

Methoxypropyl acetate.....15.00 pbw

Ordinary commercial catalyst for preparation of the polyurethane..... 0.13 pbw

Flow agent..... 0.24 pbw

Polyester modified hydroxy functional polydimethylsiloxane..... 1.00 pbw

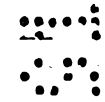
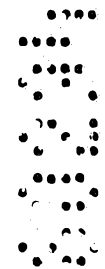
UV absorber..... 1.00 pbw

Component B

Prepolymer of aliphatic unmodified diisocyanate.....97.00 pbw

Polysiloxane modified polyisocyanate..... 3.00 pbw

Components A and B were mixed together in the ratio by wt. of 2:1 and applied as a coating to concrete. After curing (hardening) paints were sprayed on from ordinary spray guns. These were poorly accepted by the coating and ran off to some degree. After drying the coatings



of paint could easily and completely be removed by the usual cleaning agents.

Example 2

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In the formulation of example 1, in component A, 30% by wt. of the 65% solution of the strongly branched, saturated, hydroxyl group-containing polyester was replaced by a 75% solution in xylene of a strongly branched, saturated hydroxyl group-containing polyester which was modified by a low molecular fatty acid. This polyester had a hydroxyl of about 165, a hydroxyl content of about 5% and an acid number of about 15.

The coatings obtained by this medium were characterised by an increased permeability to water vapour.

Example 3

The formulation of example 1 was repeated with the variation that 20% of the 65% solution of the branched, saturated, hydroxyl group-containing polyester was replaced by a branched, saturated, hydroxyl group-containing polyester free of solvent, having a hydroxyl content of about 11.5% an equivalent weight of about 148, an acid number of less than 0.5 and a density of 20°C according to DIN 51757, of 1.03 g/cm³.

The composition gave a paint removed coating with about the same paint removing properties as the coatings of examples 1 and 3, but with a water vapour permeability which was superior to that of example 1.

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The claims defining the invention are as follows:

1. A composition for paint-removal coatings on substrates, characterised in that it contains:

5 (a) a branched, saturated, hydroxy group-containing polyester having a hydroxyl number (mg KOH/g solid resin) of from 180 to 320, a hydroxyl content, based on the solid resin, of 6 to 10% and having an acid number of 6 as the maximum,

(b) at least one polyisocyanate,

(c) a polysiloxane modified polyisocyanate,

10 (d) a polyurethane curing catalyst, and

(e) at least one organic solvent.

2. A composition according to claim 1, in that it contains, as a partial replacement of component (a), a corresponding amount of a
15 branched, saturated, hydroxyl group-containing polyester having a hydroxyl number of 120 to less than 180 and a hydroxyl content of 3 to less than 6% and/or a branched, saturated hydroxyl group-containing polyether having a hydroxyl content of 8 to 14%.

3. A composition according to claim 2 in that from 10 to 50% by wt of component (a) is replaced.

20 4. A composition according to claim 2 or claim 3 in that the hydroxyl group-containing polyester has a hydroxyl number of from 150 to 170.

25 5. A composition according to any one of claims 2 to 4 in that the hydroxyl group-containing polyester has a hydroxyl content of from 4 to 5.5%.

6. A composition according to any one of claims 2 to 5 in that the hydroxyl group-containing polyether has a hydroxyl content of from 10 to 12%.

30 7. A composition according to any one of claims 1 to 6, characterised in that it contains, in addition, (f) a polyester modified hydroxy functional polysiloxane.

8. A composition according to claim 7 characterised in that the polysiloxane is polydimethylsiloxane.

35 9. A composition according to any one of claims 1 to 8, characterised in that it contains, in addition, a flow agent.



10. A composition according to any one of claims 1 to 9 characterised in that it contains, as component (a) a branched, saturated, hydroxyl group-containing polyester having a hydroxyl number of from 210 to 290, a hydroxyl content of 7 to 9% and an acid number of
5 4.5 maximum.

11. A composition according to claim 10 characterised in that the hydroxyl number is from 240 to 280.

12. A composition according to any one of claims 1 to 11 characterised in that it contains, respectively, 100 pbw of component
10 (a), 50 to 120 pbw of component (b), 0.5 to 5 pbw of component (c) and 0.01 to 1 pbw of component (d).

13. A composition according to claim 12 characterised in that it contains 60 to 90 pbw of component (b).

14. A composition according to claim 12 or claim 13 characterised
15 in that it contains 1 to 3 pbw of component (c).

15. A composition according to any one of claims 12 to 14 characterised in that it contains 0.1 to 0.5 pbw of component (d).

16. A composition according to any one of claims 1 to 15 characterised in that it contains 100 pbw of component (a) and 100 to 250
20 pbw of component (e).

17. A composition according to claim 16 characterised in that it contains 140 to 180 pbw of component (e).

18. A composition according to any one of claims 7 to 17 characterised in that it contains, respectively, 100 pbw of component (a)
25 and 0.5 to 5 pbw of component (f).

19. A composition according to claim 18 characterised in that it contains 1 to 3 pbw of component (f).

20. A composition for paint-removal coatings on substrates substantially as hereinbefore described with reference to any one of the
30 Examples.

DATED this NINTH day of DECEMBER 1992

Carolin Beutelrock

Patent Attorneys for the Applicant
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ABSTRACT

Composition for Paint-Removal Coatings on Substrates

Compositions for paint-removal coatings on substrates which provide easy removal of paint, without their having to be applied again afterwards, are characterised in that they contain:

- 5
- a) a branched, saturated, hydroxy group-containing polyester having a hydroxyl number (mg KOH/g solid resin) of from 180 to 320, a hydroxyl content, based on the solid resin, of 6 to 10%, and an acid number of 6 as the maximum.
 - 10 b) at least one polyisocyanate,
 - c) a polysiloxane modified polyisocyanate,
 - d) a polyurethane curing catalyst, and
 - e) at least one organic solvent.