

PATENT SPECIFICATION

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NO DRAWINGS



1 230 756

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(72) Inventor JOHN HURST

(54) SEALING STRUCTURES HAVING AN ALUMINIUM BACKING

(71) We, W. R. GRACE & Co., a Corporation organized and existing under the laws of the State of Connecticut, United States of America, of 7, Hanover Square, New York 5, New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to sealants and adhesives in the form of pre-formed sheet-like structures. The structures of the invention are particularly useful for application to concrete surfaces and will be described herein chiefly by reference to such use. It is to be understood, however, that the same description applies, *mutatis mutandis*, to the sealing of other surfaces, particularly such as are found in buildings and civil engineering structures.

It is known to seal surfaces, particularly of concrete, by forming thereon a membrane of a bituminous composition or the like which is substantially impermeable to moisture and water vapour. [The term "bituminous composition" is used in this specification to include compositions containing asphalt, tar or pitch.] It is also known that such a composition may form an adhesive for a layer of cladding material, e.g. tiles and panels of linoleum, polyvinyl chloride, thermoplastic material, natural or reconstituted stone or cork, and wood block and

wood strip flooring. In the past such membranes have been formed by the application *in situ* of hot liquid bitumen, tar or pitch or a cold solution or emulsion of bitumen, tar or pitch. If desired, the membrane may be reinforced with latex, asbestos fibres or other types of filler. It is also known to provide a waterproofing membrane by the use of films of polyethylene or synthetic or natural rubber, or of bituminous roofing felt.

These known methods suffer from serious disadvantages. Thus in general the known procedures require formation of the layer of sealant *in situ* with the consequent difficulties in ensuring a uniform layer and the expense of labour at the site. Furthermore where the surface is a concrete floor which is subject to rising moisture, the adhesive must form a water- and alkali-resistant membrane, which means that water-based materials are not particularly desirable; in practice this means that a bituminous composition must be applied hot to the floor, which is highly inconvenient, or a solvent based bituminous composition must be used, which is expensive and involves fire risk. Generally the adhesive compositions currently in use require, in order to permit evaporation of solvent or aqueous content, to be placed in position some time before the cladding material is applied if a satisfactory bond is to be obtained, and this again is inconvenient.

[Price 25p]

SPECIFICATION AMENDED - SEE ATTACHED SL.

SEE ERRATA SHEET ATTACHED

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It is also known to provide the rear surface of cladding materials, particularly floor tiles, with a layer of a contact adhesive covered by a protective sheet which is removed before placing the cladding material in position. However, it is not possible to provide a satisfactory water- and alkali-resistant continuous coating under the cladding material by this means, particularly on a typical rough dusty concrete surface.

It has now been realised that considerable advantages are obtained from the use of pre-formed membranes of water-proofing pressure-sensitive adhesives. Such membranes can be produced on a large scale in a factory and then used on site. In one aspect, therefore, the invention provides a structure comprising a sheet-like support of aluminium, the support having adhered thereto a membrane of a water-proofing pressure-sensitive adhesive, the structure being at least 15 cm. in width and the membrane being at least 0.025 cm. thick.

The term "membrane of a pressure-sensitive adhesive" as used herein refers to those membranes of adhesive which, when forming part of the structures, enable the structures, when pressed by normal hand pressure against a concrete surface without any prior treatment of the membrane or the concrete, to remain stuck thereto.

The membrane can be a layer of the adhesive alone or the adhesive can contain reinforcing material, for example a scrim of glass fibres or an organic polymer, particularly to give the membrane mechanical strength; if desired the membrane can contain a plurality of layers of water-proofing pressure-sensitive adhesive (the adhesive being the same or different in the different layers), and the layers can be separated by reinforcing material in the form of a sheet.

The structures are designed to provide a continuous waterproof membrane adherent to a surface, the outer surface of the membrane having a non-adhesive surface.

It will of course be clear that for storage purposes the surface of the membrane remote from the support must have a protective coating thereon. Thus the structures of the invention as produced in the factory, stored and brought to the site are in the form of laminates of the protective coating, the membrane and the sheet-like support. The structures are conveniently available in the form of rolls.

The structures are used in accordance with the invention by applying an exposed face of the membrane to the surface to be sealed. If necessary the formation of a continuous waterproof seal over the whole surface is achieved by further applications so that each membrane overlaps its neighbour.

The widths of the structures can be up to 120 cm. and even more, depending on the

use to which they are to be put; generally they will be up to 91 cm. wide, with widths in the upper part of this range, e.g. 60 to 91 cm., being preferred where the whole of a surface is to be rendered waterproof. The thickness of the structures can also vary widely depending on the intended end use, but will generally be up to 0.63 or 0.9 cm.

A variety of adhesives can be used successfully for the membrane, but the adhesive must be such that the membrane will stick to the required surface without the use of heat or additional bonding agents; thus for application to surfaces of concrete, which are comparatively rough and dusty, the layer of adhesive is suitably 0.063 to 0.5 cm thick; the thicker the layer of adhesive, the better the waterproofing effect, but in general a layer 0.063 to 0.4 cm. is satisfactory, with thicknesses at the upper end of this range being preferred. A support having on it a single layer of adhesive 0.23 to 0.33 cm. thick is preferred.

Bituminous adhesives are generally suitable except where their colour is a disadvantage. If a bituminous adhesive is used, it is preferably formed of natural or synthetic rubber, virgin or reclaimed, blended into bitumen to provide a smooth mix. The ratio by weight of bitumen to rubber is preferably from 80:20 to 95:5, especially about 90:10. Other types of contact adhesive composition may include polychloroprene, butyl rubber, oil-based mastics or compositions containing rosins or rosin derivatives. Generally, suitable compositions have softening temperatures (measured by the Ring and Ball method) of 60 to 100°C. and penetration values of 150—300 at 25°C. (100 g. 5 secs—Institute of Petroleum method).

A wide variety of materials can be used to provide protective coatings in the structures of the invention. Paper having a release coating thereon, e.g. siliconised paper or paper having a coating thereon of a vinyl chloride polymer, is satisfactory. Other materials include films of organic polymers, particularly vinyl chloride polymers.

If desired, the surface of the support remote from the membrane can be treated to protect it from damage and/or so that it offers an improved keying surface for other material, e.g., concrete, subsequently applied thereto. Thus this surface of the support can be textured and/or can carry a layer of adhesive, which is preferably water-resistant and may be the same as or different from the adhesive in the membrane, to which layer is adherent a deposit of granular or powdered material, e.g. finely divided aggregate or other organic or inorganic material, e.g. sand or cork granules.

As noted above, the structures are used to provide a waterproof membrane over a surface, particularly a concrete surface, by

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applying the exposed face of the membrane to the surface, a plurality of overlapping structures being used if necessary in order to form a continuous membrane over the whole surface. After the structure has thus been applied it is usual to form or place another surface adjacent thereto, e.g. another mass of concrete, a sand or cement screed or other floor finish, a layer of asphalt or a cladding material.

The structures of the invention can be prepared without difficulty by techniques known *per se*. It is preferred to use adhesives which are not solvent-based and are heated. Thus the adhesive may be bonded to the substrate to form a uniform layer. If it is desired to incorporate a sheet-like reinforcing layer in the membrane, this can be achieved, for example by pressing a scrim into the layer of adhesive. Such a reinforcing layer is not generally required when a support is used, but is often helpful when there is no support, in order to prevent excessive distortion of the membrane when the protective coatings are removed.

Patent Application No. 22788/70 (Serial No. 1,230,754) describes structures comprising a sheet-like support of polyethylene or polypropylene, the support having adherent thereto a membrane of a water-proofing pressure-sensitive adhesive which is a bituminous rubber composition, the structure being at least 15 cm. wide and the membrane being at least 0.025 cm. thick, while Patent Application No. 47419/66 (Serial No. 1,230,753) describes other structures comprising a sheet-like substrate and contiguous thereto a membrane of a water-proofing pressure-sensitive adhesive, the structure being at least 15 cm. in width and the membrane being at least 0.025 cm. thick. A method of forming a waterproof seal on a surface using the latter structures is described in Patent Application No. 22789/70 (Serial No. 1,230,755).

WHAT WE CLAIM IS:—

1. A structure comprising a sheet-like support of aluminium, the support having adhered thereto a membrane of a water-proofing pressure-sensitive adhesive, the structure being at least 15 cm. in width and the membrane being at least 0.025 cm. thick.

2. A structure according to claim 1 wherein the support has a thickness of at most 0.63 cm.

3. A structure according to claim 1 or 2 wherein the support is an aluminium film.

4. A structure according to any one of the preceding claims wherein the surface of the film remote from the layer of adhesive is textured.

5. A structure according to any one of the preceding claims which comprises also a layer of adhesive one face of which is

adherent to the surface of the support remote from the membrane.

6. A structure according to any one of the preceding claims wherein the other face of the layer of adhesive has adherent thereto a deposit of granular or powdered material.

7. A structure according to claim 5 or 6 wherein the adhesive of said second layer is the same as the adhesive of the membrane.

8. A structure according to any one of the preceding claims which also comprises a protective coating over the surface of the membrane remote from the support, the said protective coating being such that it can be physically removed from the membrane without substantially damaging the membrane.

9. A structure according to claim 8 wherein the protective coating is paper having a release coating on the surface adjacent to the membrane.

10. A structure according to claim 9 wherein the protective coating is siliconised paper.

11. A structure according to claim 9 wherein the protective coating is a film of an organic polymer.

12. A structure according to claim 11 wherein the protective coating is a film of a vinyl chloride polymer.

13. A structure according to any one of the preceding claims wherein the membrane is 0.063 to 0.4 cm. thick.

14. A structure according to claim 13 wherein the membrane is 0.23 to 0.33 cm. thick.

15. A structure according to any one of the preceding claims wherein the pressure-sensitive adhesive is a bituminous composition.

16. A structure according to claim 15 wherein the bituminous composition is a bituminous-rubber composition.

17. A structure according to claim 16 wherein the bituminous-rubber composition is a blend of natural or synthetic rubber and bitumen, the ratio by weight of bitumen to rubber being from 80:20 to 95:5.

18. A structure according to any one of the preceding claims which is up to 120 cm. wide.

19. A structure according to claim 18 which is up to 0.63 cm. thick.

20. A structure according to any one of the preceding claims which is 15 to 91 cm. wide.

21. A structure according to claim 20 which is 60 to 91 cm. wide.

22. A structure according to claim 1 substantially as hereinbefore described.

23. A method of forming a waterproof seal on a surface which comprises applying to the surface an exposed face of the membrane of a structure according to any one of the preceding claims.

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applying the exposed face of the membrane to the surface, a plurality of overlapping structures being used if necessary in order to form a continuous membrane over the whole surface. After the structure has thus been applied it is usual to form or place another surface adjacent thereto, e.g. another mass of concrete, a sand or cement screed or other floor finish, a layer of asphalt or a cladding material.

The structures of the invention can be prepared without difficulty by techniques known *per se*. It is preferred to use adhesives which are not solvent-based and are heated. Thus the adhesive may be bonded to the substrate to form a uniform layer. If it is desired to incorporate a sheet-like reinforcing layer in the membrane, this can be achieved, for example by pressing a scrim into the layer of adhesive. Such a reinforcing layer is not generally required when a support is used, but is often helpful when there is no support, in order to prevent excessive distortion of the membrane when the protective coatings are removed.

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2. A structure according to claim 1 wherein the support has a thickness of at most 0.63 cm.

3. A structure according to claim 1 or 2 wherein the support is an aluminium film.

4. A structure according to any one of the preceding claims wherein the surface of the film remote from the layer of adhesive is textured.

5. A structure according to any one of the preceding claims which comprises also a layer of adhesive one face of which is

adherent to the surface of the support remote from the membrane.

6. A structure according to any one of the preceding claims wherein the other face of the layer of adhesive has adherent thereto a deposit of granular or powdered material.

7. A structure according to claim 5 or 6 wherein the adhesive of said second layer is the same as the adhesive of the membrane.

8. A structure according to any one of the preceding claims which also comprises a protective coating over the surface of the membrane remote from the support, the said protective coating being such that it can be physically removed from the membrane without substantially damaging the membrane.

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12. A structure according to claim 11 wherein the protective coating is a film of a vinyl chloride polymer.

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16. A structure according to claim 15 wherein the bituminous composition is a bituminous-rubber composition.

17. A structure according to claim 16 wherein the bituminous-rubber composition is a blend of natural or synthetic rubber and bitumen, the ratio by weight of bitumen to rubber being from 80:20 to 95:5.

18. A structure according to any one of the preceding claims which is up to 120 cm. wide.

19. A structure according to claim 18 which is up to 0.63 cm. thick.

20. A structure according to any one of the preceding claims which is 15 to 91 cm. wide.

21. A structure according to claim 20 which is 60 to 91 cm. wide.

22. A structure according to claim 1 substantially as hereinbefore described.

23. A method of forming a waterproof seal on a surface which comprises applying to the surface an exposed face of the membrane of a structure according to any one of the preceding claims.



24. A method according to claim 23 wherein the surface is of concrete.
25. A method according to claim 23 or 24 wherein a continuous waterproof seal is formed over the whole surface by the use of overlapping structures and the surfaces of another material is formed or placed in contact therewith.
26. A method according to claim 25 wherein the other surface is of concrete, sand or cement screed or asphalt.
27. A method according to claim 23 substantially as hereinbefore described.
28. A surface treated in accordance with the method according to any one of claims 23 to 27.

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PATENTS ACT 1949

SPECIFICATION NO 1230756

In accordance with the Decision of the Principal Examiner, acting for the Comptroller-General, dated 25 June 1973 this Specification has been amended under Section 14 in the following manner:-

Page 2, line 21, page 3, line 50, *after* adhesive, *insert* which is a bituminous-rubber composition,

Page 2, *delete* lines 74 and 75 *insert* The adhesive

Page 2, *delete* lines 89, 90 and 91 *insert* The bituminous rubber composition is

Page 2, *delete* lines 97 to 100 *insert* 90:10.

Page 3, *delete* lines 101 to 107

Page 3, for claims 17 to 23 read 15 to 21

Page 3, line 108, *delete* claim 16 *insert* any one of the preceding claims

Page 3, line 116, *delete* 18 *insert* 16

Page 3, line 121, *delete* 20 *insert* 18

Page 4, for claims 24 to 28 read 22 to 26

Page 4, line 1, *delete* 23 *insert* 21

Page 4, lines 3 and 4 *delete* 23 or 24 *insert* 21 or 22

Page 4, line 9, *delete* 25 *insert* 23

Page 4, line 12, *delete* 23 *insert* 21

Page 4, line 16, *delete* 23 to 27 *insert* 21 to 25

THE PATENT OFFICE
26 September 1973

R 70946/4

ERRATUM

SPECIFICATION NO 1230756



Page 2, line 37, for membrane read membranes

THE PATENT OFFICE
17 October 1973

R 72013/2