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(54) Title: COOL ROOF COVERING



(57) Abstract: A roof covering (10) comprising a plastic film (40) and an adhesive (46) positioned under the lower film surface (44). The film (40) can be a plastic film selected to provide substantial solar reflectance and high thermal emittance and the adhesive (46) can be a pressure-sensitive adhesive. The roof covering (10) of the present invention can be provided in a roll, sheets, or other medium, and it can be applied to an EPDM membrane after the membrane is assembled to the roof. The roof covering (10) can instead be incorporated into a laminate including an EPDM membrane and assembled to the roof at the same time as the membrane.

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Title: COOL ROOF COVERINGFIELD OF THE INVENTION

The present invention relates generally, as indicated, to a roof wrap and, more particularly, to a material used for covering EPDM (black rubber) membranes on low-slope roofs.

BACKGROUND OF THE INVENTION

5 During the last several years, the U.S. Environmental Protection Agency (EPA), U.S. Department of Energy (DOE), major energy service providers (electric utility companies), utility regulatory agencies, air quality management officials, and the roofing industry have increasingly focused on the energy efficiency impact of
10 alternative roof designs. Research at national laboratories and actual construction installations have shown that certain types of roofs that have high solar reflectance and that readily release or emit any absorbed heat can reduce summertime peak roof surface temperatures by over 50°F and often cut air conditioning loads by over 20%. These roofs have come to be called “cool roofs.”

15 Cool roofs can translate into significant savings to building owners, especially since such roofs have the greatest impact during summertime peak use periods when electricity rates are often highest. Utilities generally welcome reductions during peak periods, as this helps to avoid overloads to generation capacity (and in the worst case, rolling blackouts). Flattened peak demand also allows energy
20 service providers to delay power plant expansions, run at higher overall capacity utilization, and deliver a greater return to utility shareholders. Additionally, the EPA welcomes the reduction of greenhouse gas emissions related to reduced power generation.

The EPA also sees cool roofs as a key tactic for the reduction of the “Urban
25 Heat Island” effect that is now occurring in many cities. Specifically, in these cities the increase in heat-absorbing roofs, dark parking lots, and road systems in place of trees and vegetation has caused urban areas to be several degrees warmer than the surrounding countryside. Higher summertime temperatures rapidly accelerate the photochemical reactions that generate smog. For example, in Los Angeles each
30 degree increase in temperature above 70°F increases smog generation by 3%.

Studies show that transitioning to more cool roofs, lighter pavement, and more urban greenery could have dramatic effects on the air quality of many cities. Beyond these air quality benefits, cool roofs often reduce thermal stresses on roof systems and block harmful UV rays that prematurely degrade conventional asphalt roofing. Thus, cool roofs can help extend roof life, thereby reducing the need for re-roofing and consequently decreasing landfill waste.

The late 1990's witnessed a major trend towards cool roofs in non-residential building, with states such as Georgia, Florida, and California taking the lead through building energy code changes. In 1999, the U.S. EPA launched an ENERGY STAR® program for roofing (www.energystar.gov). In 2001-2002, California offered rebates for cool roof installations, and by 2005 cool roofs may be mandated in California. In January 2003, the Cool Roof Rating Council (www.coolroofs.org) started its Product Rating Program, which the industry expects will become the key reference database for future ENERGY STAR®, state and local utility programs.

Today's commercially-available Cool Roofs fall into two basic categories: thermoplastic single ply membranes and fluid-applied (coating) systems. Regarding single ply membranes, TPO and PVC (factory-produced 45-80 mil reinforced sheets of formulated thermoplastics), which are installed with mechanical fasteners, adhesives, and heat welding on low-slope roofs, are the leading candidates. Regarding fluid-applied systems, water-based acrylic elastomeric coatings dominate this segment, and are installed in conjunction with other roofing components so as to provide roof waterproofing or are installed over many existing roof types so as to preserve those roofs from sun degradation and premature failure.

Among conventional low-slope roof types, EPDM (rubber) membranes have long maintained a major market share. EPDM is cost-effective to install, has proven long-term durability, and has widely been accepted by leading roofing contractors, key architects, and specifiers. Presently, there is believed to be over 10 billion square feet of installed black EPDM roofing and, thus, these roofs represent a very large opportunity for the conversion of non-residential building roofs to more energy-efficient cool roofs. In fact, several roofing manufacturers and contractors are currently seeing high growth in EPDM restoration with fluid-applied "cool roof" coatings.

The presently-used coatings for EPDM roofs appear to reduce the air conditioning load on buildings, significantly improve building comfort in non-conditioned spaces, and eliminate peak 200°F temperatures and associated high thermal stresses that lead to seam failures and damage at key wall and penetration
5 junctures. However, these coatings are not without disadvantages. As a specific example, acrylic coatings have generally low adhesion to the EPDM material. Also, surface preparation requirements involve multiple washings and chemical additives to thoroughly clean and condition the EPDM in order to improve bonding of the coatings. (Surface preparation alone can cost \$0.20 per square foot.) Additionally,
10 a significant coverage of the coating is required in order to achieve minimum adhesion and mechanical properties of the elastomeric coating (usually a minimum of 15 dry mils of coating, which converts to \$0.30-\$0.50 per square foot in coating and related materials costs). Further, two-pass coating applications are necessary due to the curing requirements of water-based coatings and the overall dry mils
15 required. Still further, the marked-up labor needed to install coating systems is expensive (it often exceeds \$0.50 per square foot), in that special equipment (e.g., airless spray rigs) requires skilled labor (e.g., trained spray mechanics). Moreover, because of drying/curing requirements and/or overspray risks, there are frequent environmental constraints on application time due to low temperatures, high
20 humidity, near-term inclement weather, and high winds.

SUMMARY OF THE INVENTION

The present invention provides a cost-effective cool-roof covering for EPDM roofs that eliminates the disadvantages associated with conventional coating techniques. Specifically, the covering requires less membrane cleaning/preparation
25 to achieve sufficient adhesion, provides more uniform adhesion to the entire roof, is less susceptible to localized de-lamination and failure, does not require special spray equipment and/or highly skilled spray mechanics, can be installed over a much broader temperature/humidity range, requires less cure time prior to being exposed to rain and dew, and can be installed faster and cheaper than two-pass
30 coating applications. Moreover, the covering can be made in the form of a uniform thickness, factory-produced protective film.

More particularly, the present invention provides a roof covering comprising a plastic film and an adhesive positioned under the lower film surface. The film can be a plastic film selected to provide substantial solar reflectance and high thermal emittance. The adhesive can be a pressure-sensitive adhesive and can be selected
5 to be installation-compatible with about 40-110°F ambient temperatures and/or with roof surface temperatures up to 175°F, and to provide sufficient adhesion to water-cleaned EPDM membranes. The roof covering of the present invention can be provided in a roll, sheets, or other medium and it can be factory-produced through the utilization of current high-speed, wide-web coating manufacturing processes to
10 yield self-wound rolls.

These and other features of the invention are fully described and particularly pointed out in the claims. The following description and drawings set forth in detail certain illustrative embodiments of the invention, which are indicative of but a few of the various ways in which the principles of the invention may be employed.

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DRAWINGS

Figure 1 is a front view of a building with the cool-roof covering according to the present invention installed thereon.

Figure 2A is a top view of the building with the cool-roof covering being applied in a certain manner.

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Figure 2B is another top view of the building with the cool-roof covering being applied in another manner.

Figure 3A is a perspective view of a roll of the cool-roof covering.

Figure 3B is a perspective view of a stack of the cool-roof covering.

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Figure 4 is a sectional view of the cool-roof covering, the covering comprising a film and an adhesive positioned on the lower surface of the film.

Figure 5 is a sectional view of the cool-roof covering with a photocatalytic coating positioned over the upper surface of the film.

Figure 6 is a sectional view of the cool-roof covering with a temporary liner positioned over the adhesive.

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Figure 7 is a sectional view of the cool-roof covering with a release coating positioned over the film.

Figure 8 is a sectional view of a laminate incorporating the cool-roof covering and a EPDM membrane.

DETAILED DESCRIPTION

Referring now to the drawings, and initially to Figure 1, the cool-roof covering 10 according to the present invention is shown on a residential or commercial building 12. The building 12 has a low slope roof 14 (e.g., 0° to about 10°) comprising metal structural members 16, wooden plats 18 placed on top of the members 16, and an EPDM rubber membrane 20 on top of the plats 18. (Other members, such as insulation board, can also be included in the roof structure.) The cool-roof covering 10 is adhered to the rubber membrane 20.

As is shown in Figure 2A, the covering 10 can be applied in strips running the length of the roof 14. Alternatively, of course, the strips could be positioned to run the width of the roof 14. In either or any event, the cool-roof covering 10 can be provided in a roll 30 as shown in Figure 3 and provided in widths of, for example, at least 2 feet and, more particularly, from about 30 to about 150 inches. With particular reference to EPDM rubber membrane applications, the widths could correspond to the dimensions of the rubber membranes 20, such as, for example, 10 feet or 12 feet. The roll can be a suitable length for transportation and/or installation purposes, such as 150 feet long.

As shown in Figure 2B, the covering 10 can be applied in rectangular sections, and these can be provided in a stack 32 such as that shown in Figure 4. The rectangular sections can have a width W of about one foot, greater than one foot, and/or greater than two feet, and a length L within 20% of the width, within 30% of the width, within 50% of the width, about the same as the width, or longer than the width. Sections having a rectangular shape often are the most compatible with roofing applications, and the size is selected to accommodate transportation and/or installation purposes. That being said, other non-rectangular shapes (e.g., triangular, curved-sides) are possible with and contemplated by the present invention.

Whether the covering 10 is provided in a roll, sheets, or other medium, it can be factory-produced through the utilization of current high-speed, wide-web coating

manufacturing processes to yield self-wound rolls, lined pressure sensitive adhesive articles, and/or membrane-laminates.

If the covering 10 will be installed in strips (Figure 2A), the roll 30 can be shipped to the construction site ready for installation on cleaned EPDM roofs. When the covering 10 is provided in roll form, it usually has an unrolled length of at least about ten times its width, at least about twenty times its width, and/or at least about thirty times its width. If the covering 10 is to be provided in a stack, a similar process can be used to produce a continuous length of material having a width equal to the desired width of the sections and then automatically separate it into sheets of the desired length.

Referring now to Figure 4, the cool-roof covering 10 is illustrated in detail isolated from the rest of the roof. As shown, the covering 10 comprises a plastic film 40 having a first (upper) surface 42 and a second (lower) surface 44, and an adhesive 46 positioned under the lower film surface 44. Preferably, the adhesive 46 is factory-applied to the plastic film at line speeds of 150-3000 feet per minute through the use of various high speed, wide web coating technologies (*e.g.*, gravure, roll, knife, extrusion die, etc.). This translates into lower assembly costs and, therefore, lower costs versus conventional high performance coatings. Also, a factory-applied process results in greater consistency in protective film thicknesses and mechanical properties per pre-determined incoming plastic film specifications. Furthermore, such a process offers tighter control over the application rates of the pressure-sensitive adhesive 46. It may be noted that such tight control is essentially impossible when adhesive or roof coatings are applied at the time of installation by a roofer. The plastic film 40 can have a thickness in the range of about 3 to about 50 mils thick and a width equal to that of the roll 30 (*e.g.*, typical widths would be in the range of about 30 to about 80 inches). Suitable plastic films include acrylics such as poly(methyl methacrylate) and poly(ethyl methacrylate), polystyrenes such as poly(p-styrene) and syndiotactic polystyrene, and styrene-based copolymers, vinylic such as polyvinyl chloride, polyvinylidene chloride, polyvinylidene fluoride and polyvinylidene dichloride, polyolefin homopolymers such as polyethylene and polypropylene, copolymers of ethylene, propylene and/or butylene, copolymers containing ethylene such as ethylene vinyl acetate, ethylene

acrylic acid and ethylene methacrylate copolymer, polyesters such as polyethylene terephthalate, polyethylene butyrate and polyethylene naphthalate, polyamides such as polyhexamethylene adipamide, polyurethanes, polycarbonates, and polyvinyl alcohol; and mixtures thereof.

5 Preferably, the plastic film 40 has a greater than 60% solar reflectance, and preferably about an 80% solar reflectance, per ASTM E1918-97 and ASTM E903-96 and greater than 60% thermal emittance, and preferably about 90% thermal emittance, per ASTM E408-71. The plastic film 40 preferably also provides sufficient low-temperature flexibility so as to be able to withstand temperatures down
10 to about -30°F without cracking or breaking, and suitable tensile and impact strength so as to be able to withstand periodic foot traffic and typical building movement. Self-cleaning characteristics can also be important to maintain greater than 65% solar reflectance after three years. The plastic film 40 can also preferably display suitable conformability under typical field conditions (e.g., involving modest
15 brush pressure) to create tight fits over EPDM seams and patches. Long-term weatherability with UV resistance, exterior durability including ozone resistance, minimal plasticizer (if present) of low temperature flexibility and tensile & impact strength after 10,000 hours weather-o-meter exposure, are also desirable features.

The adhesive 46 can be a pressure-sensitive adhesive applied at 15-60 gsm
20 to the lower film surface 44. Preferably, the adhesive 46 is installation-compatible with about 40-110°F ambient temperatures and with roof surface temperatures up to 175°F. Its initial peel strength (or tack) should provide a sufficient bond, but also allow for adhesive repositionability for the elimination of wrinkles. Further the adhesive 46 preferably has aged peel and sheer values (after 12-72 hours) to
25 provide sufficient adhesion over EPDM that has been pressure-washed (water) to clean off loose inorganic material (e.g., mica), dirt, and oils and is suitable for an operating temperature range of -20°F to 180°F. The adhesive 46 further preferably has the ability to resist ponding or standing water by maintaining suitable adhesion when exposed to water.

30 The adhesive 46 can substantially cover the surface 44 or it can be patterned thereover. For example, the pattern can comprise a patchwork pattern of unconnected squares, smooth or sharp sine waves, and/or a honeycomb design

having cells positioned in aligned or offset rows. The pattern can be as simple as a series of dots or a series of longitudinally-extending stripes. The pattern can have a random positioning of voids. Accordingly, the pattern of the adhesive 46 can comprise a continuous or discontinuous network of geometric shapes.

5 Referring now to Figure 5, the cool-roof covering 10 can further comprise a photocatalyst coating 48. The coating 48 can preferably comprise a coating with titania (TiO_2) as a photocatalyst having a decomposing function including deodorizing, antibacterial and soil-resisting actions, and also a hydrophilic function. Photocatalysts containing as the major component titania having excellent
10 decomposing and hydrophilic functions have been utilized conventionally in many fields. Irradiation of ultraviolet light contained in the sunlight or fluorescent light upon titania causes generation of electrons and positive holes on the titania surface, and the electrons reduce the atmospheric oxygen into super oxide ions (O_2^-), whereas the positive holes oxidize the moisture deposited on the titania surface into
15 hydroxyl group radicals ($\text{OH}^\cdot$). These superoxide ions and hydroxyl group radicals carry out oxidative decomposition of organic compounds including soil and the like present on the titania surface. As was indicated above, self-cleaning characteristics can also be important to maintain greater than 65% solar reflectance after three years.

20 Referring now to Figure 6, the covering 10 can further comprise a removable liner 50, which is temporarily attached to the adhesive 46 and removable therefrom prior to installation. This liner 50 can comprise a paper or plastic film, which is easily removed from the adhesive 46 and allows the covering 10 to be provided in roll form (Figure 3A) and/or stack form (Figure 3B).

25 Referring now to Figure 7, the covering 10 can comprise a release coating 52 over the first (upper) surface 42 of the film 40. The release coating 52 can be a silicone-based release coating and, in any event, preferably allows a sufficient release force to facilitate separation and installation from a wound roll (e.g., Figure 3A) or a stacked pile (e.g., Figure 3B). The release coating 52 preferably has a dry
30 coefficient of friction that safely allows periodic roof foot traffic, which may be accomplished, for example, by texturing. The coating 52 also preferably has long-term weatherability with UV resistance and exterior durability (including ozone

resistance) after 10,000 hours weather-o-meter exposure. If the release coating 52 will remain with the roof covering 10 after installation, and if it is to be used for seam-bonding purposes, the coating must strike a balance between sufficient installation separation and adequate seam bonds. (One alternative is not to depend
5 upon the overlapping of sections for bonding purposes and to instead use tape or other sealing strips to seal the joints between adjacent sections of the covering 10.)

The roof wrap covering 10 can be installed after the EPDM membranes 20 are assembled on the plats 18 or otherwise assembled onto the roof 14. Alternatively, as is shown in Figure 8, the roof wrap covering 10 can be adhered to
10 the EPDM membranes 20 prior to assembly of these membranes. In this manner, the installation of the roof wrap covering and the EPDM membranes can be accomplished in a single step and provided in laminate form.

It may now be appreciated that the cool roof covering 10 of the present invention greatly reduces installation time, cost, and complications when compared
15 to conventional cool roof products. The covering 10 can arrive ready-to-install at a work site, and application of film rolls can be achieved through the use of simple roll carts, brush applicators, and cutting tools. There is no need for more complex and costly application equipment, such as specialized spray rigs, as well as the need for trained spray mechanics. Installation can be accomplished in a single pass (versus
20 two passes with conventional elastomeric coatings over one or more days). Also, the cool roof covering can be used by do-it-yourself home owners, something that would be almost impossible with conventional cool roof products.

The cool roof covering 10 also eases installation by eliminating some conventional set-up procedures. As a specific example, the covering 10 allows for
25 fully-adhered coverage over EPDM membranes that are cleaned with only high-pressure water washing techniques without the need for special cleaning and membrane conditioning chemicals. This roofing product also avoids the extra set-up time commonly dedicated to preventing overspray and odors, as these cause occupant concerns when the sprayed coatings creep into the building's HVAC and
30 vent systems.

The cool roof covering 10 further provides an increased degree of customized installation, with the ability to incorporate high performance taping of EPDM seams,

double or triple film applications in high traffic areas, for example. Installers can monitor quality in real time by visually noting film application, wrinkling, and other factors.

It may also now be appreciated that the cool roof covering 10 provides a consistency not found in other cool roof products. Because the adhesive 46 is applied prior to the work site, the roof covering 10 eliminates the variability and risk associated with numerous commercially available acrylic coatings that differ in formulation, adhesion characteristics, and long-term exterior durability. The cool roof covering 10 also avoids the variability and risk associated with inconsistent wet coating thicknesses and the impact such inconsistency has on coating cure time and final coating film integrity and performance.

It may further be noted that weather and dependence upon weather reports is minimized with the cool roof covering 10 of the present invention. Specifically, the cool roof covering 10 permits EPDM installation in colder temperatures, higher humidity, and within a few hours of inclement weather. In comparison, most acrylic coatings must be installed above 50°F and allowed to dry and cure for days prior to precipitation.

Although the invention has been shown and described with respect to certain preferred embodiments, it is evident that equivalent and obvious alterations and modifications will occur to others skilled in the art upon the reading and understanding of this specification. For example, the roof covering need not be
5 limited to solar-reflecting situations (e.g., "cool roofs") but instead could be modified to include other characteristics needed in a particular roofing application. The present invention includes all such alterations and modifications and is limited only by the scope of the following claims.

CLAIMS

1. A roof covering comprising a film and an adhesive; the film having a first surface and a second surface and the adhesive being positioned on the second surface.
- 5 2. A roof covering as set forth in the preceding claim, wherein the film has a thickness in the range of about 3 to about 50 mils.
3. A roof covering as set forth in either of the preceding claims, wherein the film has a width of at least 2 feet.
4. A roof covering as set forth in the preceding claim, wherein the film has
10 a width of about 30 inches to about 80 inches.
5. A roof covering as set forth in the preceding claim, wherein the film comprises a plastic film.
6. A roof covering as set forth in the preceding claim, wherein the plastic
film comprises acrylics such as poly(methyl methacrylate) and poly(ethyl
15 methacrylate), polystyrenes such as poly(p-styrene) and syndiotactic polystyrene,
and styrene-based copolymers, vinylic such as polyvinyl chloride, polyvinylidene
chloride, polyvinylidene fluoride and polyvinylidene dichloride, polyolefin
homopolymers such as polyethylene and polypropylene, copolymers of ethylene,
propylene and/or butylene, copolymers containing ethylene such as ethylene vinyl
20 acetate, ethylene acrylic acid and ethylene methacrylate copolymer, polyesters such
as polyethylene terephthalate, polyethylene butyrate and polyethylene naphthalate,
polyamides such as polyhexamethylene adipamide, polyurethanes, polycarbonates,
and polyvinyl alcohol; and mixtures thereof.
7. A roof covering as set forth in either of the preceding claims, wherein
25 the plastic film comprises additives and/or pigments.

8. A roof covering as set forth in any of claims 5-8, wherein the film has a greater than 60% solar reflectance per ASTM E1918-97 and ASTM E903-96.

9. A roof covering as set forth in the preceding claim, wherein the film has an about 80% or greater solar reflectance per ASTM E1918-97 and ASTM E903-96.

5 10. A roof covering as set forth in any of claims 5-9, wherein the film has a greater than 60% thermal emittance per ASTM E408-71.

11. A roof covering as set forth in any of claims 5-10, wherein the film has an about 90% or greater thermal emittance per ASTM E408-71.

10 12. A roof covering as set forth in any of claims 5-11, wherein the film has self-cleaning characteristics such that it maintains greater than 65% solar reflectance after three years.

13. A roof covering as set forth in any of claims 5-12, wherein the film has a self-cleaning top coat.

15 14. A roof covering as set forth in any of claims 5-13, wherein the film has a photocatalyst coating.

15. A roof covering as set forth in the preceding claim, wherein the film has titania (TiO₂) as a photocatalyst.

20 16. A roof covering as set forth in any of claims 5-15, wherein the film has sufficient low-temperature flexibility to withstand temperatures down to about -30°F without cracking or breaking.

17. A roof covering as set forth in any claims 5-16, wherein the film has suitable tensile and impact strength so as to withstand periodic foot traffic and typical building movement.

18. A roof covering as set forth in any of claims 5-17, wherein the film has suitable conformability under typical field conditions so as to create tight fits over EPDM seams and patches.

19. A roof covering as set forth in any of claims 5-18, wherein the film has
5 long-term weatherability with UV resistance, exterior durability including ozone resistance, minimal plasticizer (if present) of low temperature flexibility and tensile & impact strength after 10,000 hours weather-o-meter exposure.

20. A roof covering as set forth in any of claims 5-19, wherein the adhesive comprises a pressure-sensitive adhesive.

10 21. A roof covering as set forth in any of the preceding claims, wherein the adhesive is applied at about 15-60 gsm to the lower film surface.

22. A roof covering as set forth in any of the preceding claims, wherein the adhesive is installation-compatible with about 40-110°F ambient temperatures and/or with roof surface temperatures up to 175°F.

15 23. A roof covering as set forth in any of the preceding claims, wherein the adhesive has an initial peel strength (tack) so as to provide a sufficient bond, but still allow for adhesive repositionability for elimination of wrinkles.

24. A roof covering as set forth in any of the preceding claims, wherein the adhesive has aged peel and shear values (after 12-72 hours) so as to provide
20 sufficient adhesion over EPDM that has been pressure-washed clean of loose inorganic material, dirt, and oils.

25. A roof covering as set forth in any of the preceding claims, wherein the adhesive is suitable for a operating temperature range of -20°F to 180°F.

26. A roof covering as set forth in any of the preceding claims, wherein the adhesive has the ability to resist ponding or standing water by maintaining suitable adhesion when exposed to water.

27. A roof covering as set forth in any of the preceding claims, wherein the
5 adhesive substantially completely covers the second surface of the film.

28. A roof covering as set forth in any of the preceding claims, wherein the adhesive is applied in a pattern that does not substantially completely cover the second surface of the film.

29. A roof covering as set forth in claim 28, wherein the pattern is a
10 continuous pattern.

30. A roof covering as set forth in claim 28, wherein the pattern is a discontinuous pattern.

31. A roof covering as set forth in claim 28, wherein the pattern essentially consists of a random arrangement of adhesive and/or a random arrangement of
15 adhesive voids.

32. A roof covering as set forth in any of the preceding claims, further comprising a release coating on the first surface of the film.

33. A roof covering as set forth in the preceding claim, wherein the release coating is a silicone-based release coating.

20 34. A roof covering as set forth in either claim 32 or claim 33, wherein the release coating allows a sufficient release force to facilitate separation and installation from a wound roll while still providing a minimum bond between overlapping adjacent sheets.

35. A roof covering as set forth in any of claims 32-34, wherein the release coating has a dry coefficient of friction that safely allows periodic roof foot traffic.

36. A roof covering as set forth in any of claims 32-35, wherein the release coating has long-term weatherability with UV resistance and exterior durability
5 (including ozone resistance) after 10,000 hours weather-o-meter exposure.

37. A roof covering as set forth in any of the claims 32-36, further comprising a temporary liner positioned over the release coating, the temporary liner and the release coating being removed prior to installation.

38. A roof covering as set forth in any of claims 1-37, wherein the covering
10 is provided on a roll and has an unrolled length of at least ten times its width.

39. A roof covering as set forth in any of claims 1-37, wherein the covering is provided in sheets having a length within 20% of the width, about the same as the width, or longer than the width.

40. A roof covering as set forth in the preceding claim, wherein the sheets
15 have a substantially rectangular shape.

41. A roof covering as set forth in any of the preceding claims, further comprising a removable liner temporarily attached to the adhesive and removable therefrom prior to installation on the roof.

42. In combination, a roof covering as set forth in any of the preceding
20 claims, and a roof, the adhesive being adhered to the top surface of the roof.

43. The combination set forth in the preceding claim, wherein the roof comprises a EPDM membrane and wherein the roof covering is adhered to the EPDM membrane.

44. The combination set forth in claim 43, wherein the roof covering is adhered to the EPDM membrane after the EPDM membrane is assembled to the roof.

45. The combination set forth in claim 43, wherein the roof covering is
5 adhered to the EPDM membrane prior to the EPDM membrane being assembled to the roof.

46. A method of covering a roof, said method comprising the steps of:
assembling an EPDM membrane to a roof structure; and
adhering the roof covering of any of the preceding claims to the EPDM
10 membrane.

47. A method as set forth in claim 46, wherein said adhering step is performed after said assembling step.

48. A method as set forth in claim 46, wherein said adhering step is performed prior to said assembling step.

AMENDED CLAIMS

[received by the International Bureau on 12 November 2004 (12.11.04);
original claim 1 amended (1 page)]

CLAIMS

1. A roof covering comprising a film and an adhesive; the film having a first surface and a second surface and the adhesive being positioned on the second surface and adapted for adhesion to a rubber membrane.
- 5 2. A roof covering as set forth in the preceding claim, wherein the film has a thickness in the range of about 3 to about 50 mils.
3. A roof covering as set forth in either of the preceding claims, wherein the film has a width of at least 2 feet.
4. A roof covering as set forth in the preceding claim, wherein the film has
10 a width of about 30 inches to about 80 inches.
5. A roof covering as set forth in the preceding claim, wherein the film comprises a plastic film.
6. A roof covering as set forth in the preceding claim, wherein the plastic
film comprises acrylics such as poly(methyl methacrylate) and poly(ethyl
15 methacrylate), polystyrenes such as poly(p-styrene) and syndiotactic polystyrene,
and styrene-based copolymers, vinylic such as polyvinyl chloride, polyvinylidene
chloride, polyvinylidene fluoride and polyvinylidene dichloride, polyolefin
homopolymers such as polyethylene and polypropylene, copolymers of ethylene,
propylene and/or butylene, copolymers containing ethylene such as ethylene vinyl
20 acetate, ethylene acrylic acid and ethylene methacrylate copolymer, polyesters such
as polyethylene terephthalate, polyethylene butyrate and polyethylene naphthalate,
polyamides such as polyhexamethylene adipamide, polyurethanes, polycarbonates,
and polyvinyl alcohol; and mixtures thereof.
7. A roof covering as set forth in either of the preceding claims, wherein
25 the plastic film comprises additives and/or pigments.

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Figure 1

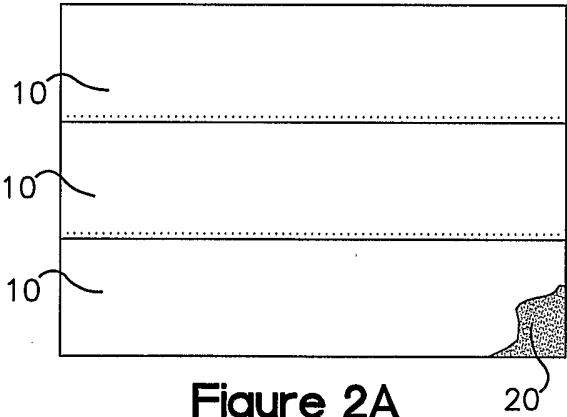


Figure 2A

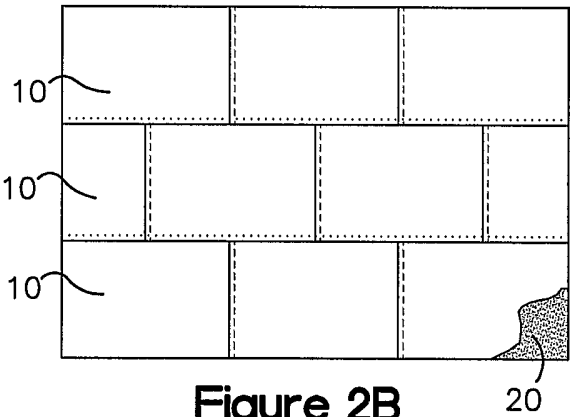


Figure 2B

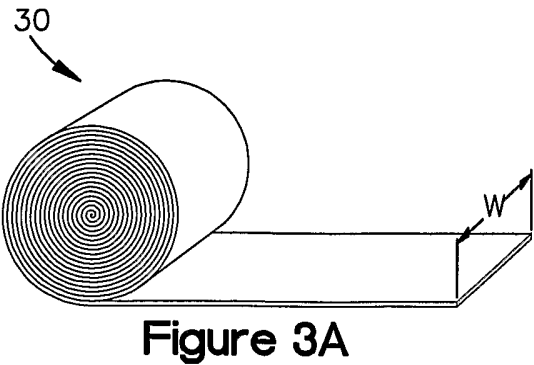


Figure 3A

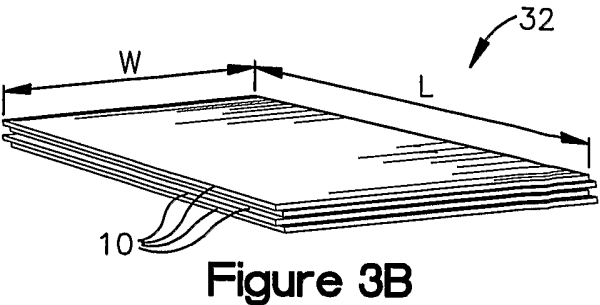


Figure 3B

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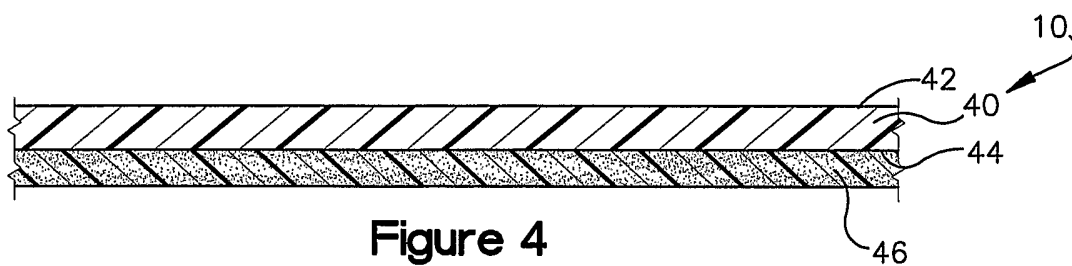


Figure 4

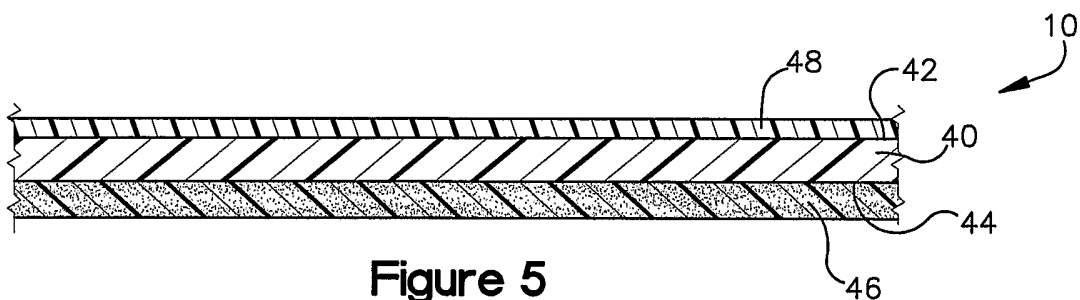


Figure 5

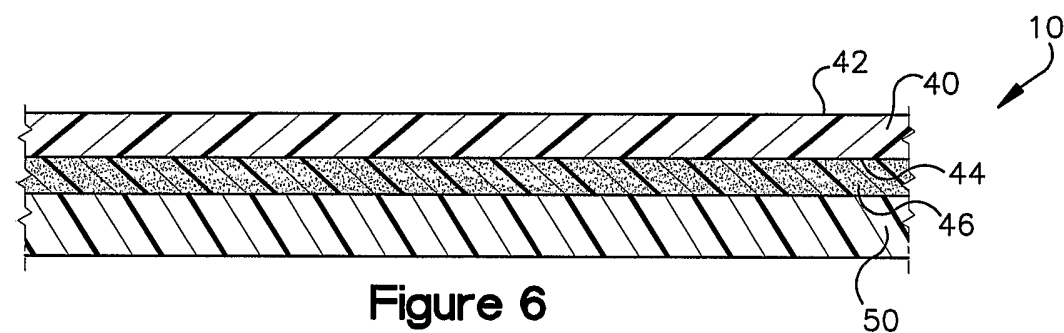


Figure 6

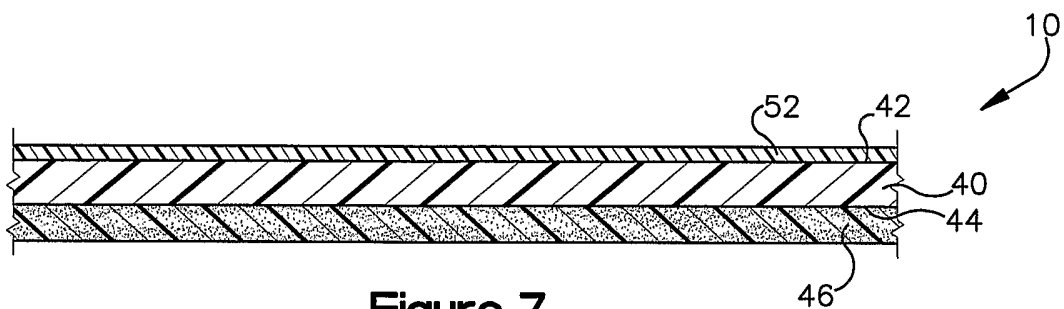


Figure 7

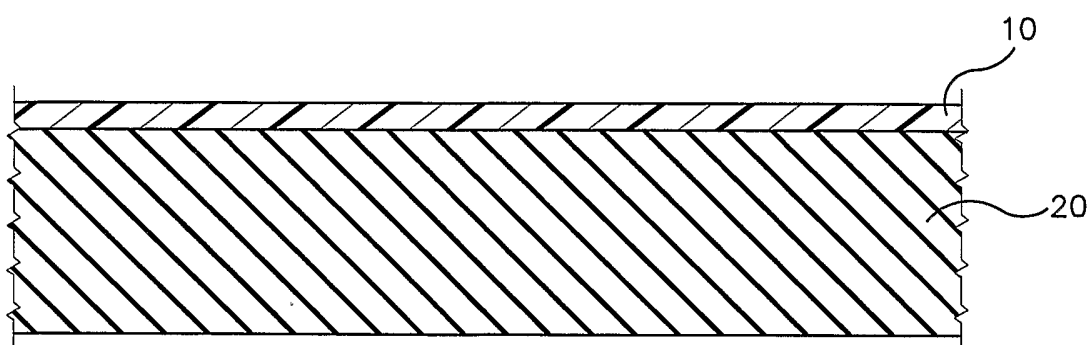


Figure 8

INTERNATIONAL SEARCH REPORT

International Application No
.../US2004/017098

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E04D5/10 E04D5/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E04D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	EP 0 704 297 A (GRACE W R & CO) 3 April 1996 (1996-04-03) column 2, paragraph 4; claims 1,5; figure 1 column 3, line 34 - line 42 column 4, line 10 - line 41 ----- -/--	1-27, 42-44, 46,47

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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- *&* document member of the same patent family

Date of the actual completion of the international search

7 September 2004

Date of mailing of the international search report

14/09/2004

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Authorized officer

Demeester, J

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/017098

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 900 102 A (HURST JOHN) 19 August 1975 (1975-08-19) abstract; claim 1; figures column 3, paragraph 1 column 3, line 21 - line 49 column 4, line 26 - line 36 column 6, paragraph 2 column 8, last paragraph column 9, paragraphs 3,5 -----	1-6, 16-27, 38-44, 46,47
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