unfrozen fluid composition. While freezing may not initially cause significant property degradation, exposure to multiple freeze-thaw cycles may progressively degrade or entirely destroy the fluid composition's utility in building envelope protection applications. In many instances, once the composition freezes, its reliability is questioned as it may not reliably produce a high-quality membrane.

[0010] A need therefore exists for water-based fluid compositions that are capable of being used at temperatures at or below freezing and in high humidity conditions.

SUMMARY OF THE DISCLOSURE

[0011] To these and other ends, embodiments of the present disclosure include a coating composition for use in the building industry and a method of applying the coating composition, including application to exterior walls of buildings at freezing and subfreezing temperatures.

[0011a] In one aspect, there is provided a coating composition for forming a barrier membrane on an exterior wall of a building, the composition comprising: a fluid mixture of water, a binder, and a sufficient amount of alcohol of at least about 3 wt%, wherein after spreading the mixture on the exterior wall, at least the binder forms the barrier membrane.

[0011b] In another aspect, there is provided a method of forming a fluid-applied membrane on a substrate comprising: while the substrate temperature is less than or equal to about 0°C, spreading the composition described herein on the substrate, wherein following curing, the fluid-applied membrane forms on the substrate.

[0011c] In another aspect, there is provided a method of applying a membrane composition to a substrate of an exterior wall of a building, comprising: providing a first mixture including at least about 82 wt% of an alcohol; providing a fluid composition including a binder and water; mixing the first mixture and the fluid composition to form a second mixture having alcohol in an amount of at least about 3 wt%; and spreading the second mixture on the substrate.

[0012] In one embodiment of the disclosure, the coating composition is a fluid mixture that includes water, a binder forming composition, and a sufficient amount of an alcohol, each described below. In general, the coating composition is water-based and so lacks large quantities of solvents typically used in solvent-based compositions. The coating compositions according to the present disclosure may be advantageously used without generating significant quantities of volatile organic compounds. These water-based fluid-applied coating compositions may be termed low VOC compositions. As is described below, while the composition is water-based, unlike prior art water-based compositions, embodiments of the present disclosure do not behave like water-based compositions. For example, embodiments of the present disclosure resist freezing at temperatures substantially lower than the prior art compositions. As a result, the coating compositions according to embodiments of the present disclosure may be stored, applied, and cured at subfreezing temperatures while the membranes formed have predictable and reliable properties that meet or exceed building standards.

[0013] Further, barrier membranes formed from the water-based fluid-applied coating composition resist degradation due to exposure to water relatively soon after application, depending on application temperature and

other environmental conditions, but are particularly well suited for subfreezing application temperatures. Thus, embodiments of the disclosure may be applied at up to 100 mils wet at near freezing temperatures (i.e., 32°F (0°C)) with less concern regarding exposure to rain and with less concern of sagging or running. Overall, embodiments of the present disclosure may be more environmentally friendly while exhibiting a robust range in application temperature, including subfreezing application temperatures, and enhanced environmental resistance soon after application. All of these characteristics benefit the contractor, who typically is responsible for application of the barrier membrane to a building, and the building owner.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the detailed description given below, serve to explain various aspects of the invention.

[0015] Fig. 1 is a cross-sectional elevation view of an exemplary exterior wall system; and

[0016] Figs. 2-17 are photographs of exemplary water-based fluid applied compositions following application to a substrate.

DETAILED DESCRIPTION

[0017] With reference to Fig. 1, in one embodiment of the invention, the coating composition may be utilized to form at least one of the layers in the construction of the exemplary exterior wall system 10. By way of example and not limitation, the coating composition may be applied to form a membrane 16 on the exterior gypsum sheathing 14, as shown. However, embodiments of the present invention are not limited to forming a membrane 16 in the exterior wall system 10 as the coating composition may be applied to other substrates. By way of example, in addition to the exterior gypsum sheathing 14, the coating composition may be applied to concrete, concrete block, plywood, oriented strand board (OSB), and many other building