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(54) **METHODS AND KITS FOR APPLICATION OF WOOD FLOORING**

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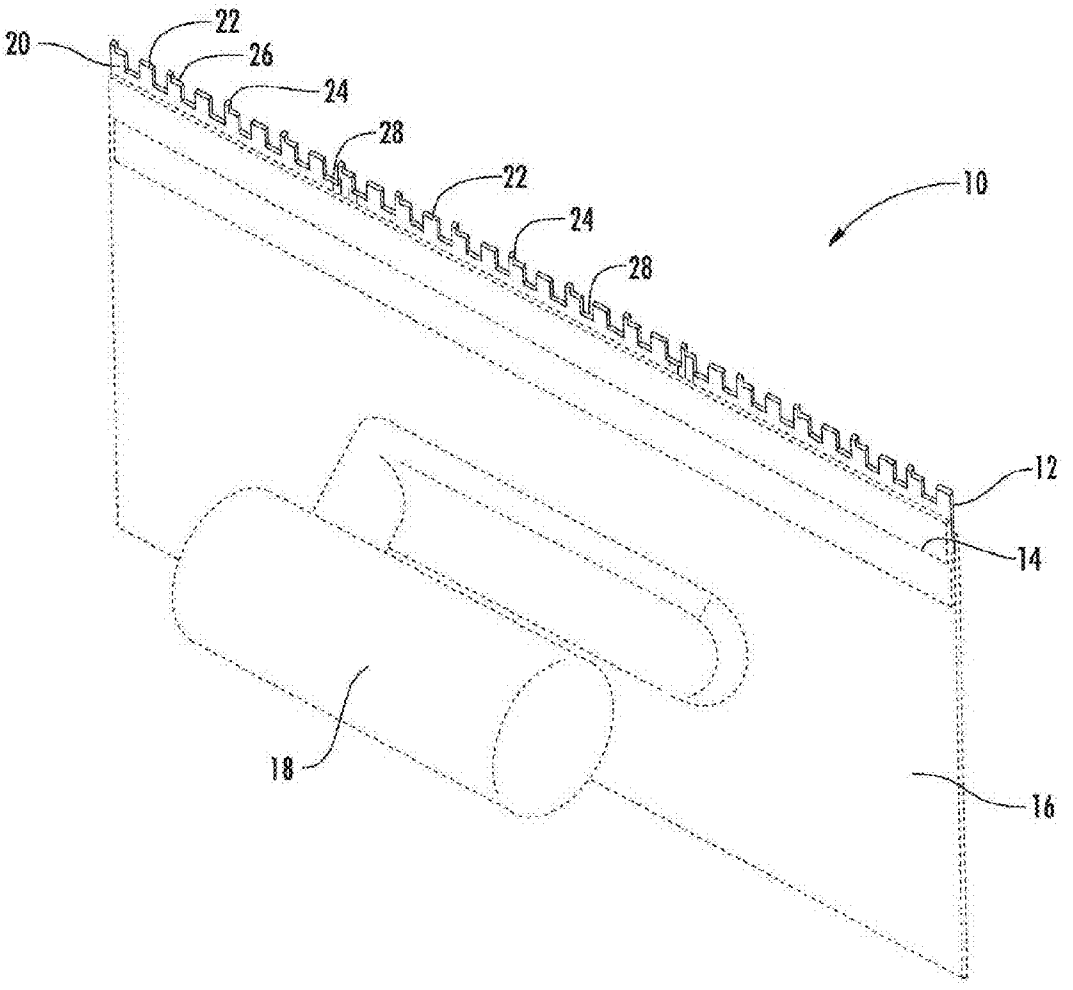
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(57) **ABSTRACT**

A kit is described which includes an acrylic composition comprising acrylic polymer in an amount of from about 8 weight percent to about 42 weight percent and an alkanolamine in an amount of from about 0.05 weight percent to about 0.5 weight percent. The kit also includes a trowel blade, the blade having an application edge defining a plurality of generally rectangular teeth, at least one of the teeth including an integrally connected projection extending from the bottom edge of the at least one tooth. The trowel blade is configured to spread the composition across a surface with the projection causing a portion of the surface to not receive the composition. The composition is configured to form an adhesive bond between the surface and wood flooring material with application of the wood flooring material causing the composition to spread across the portion of the surface that did not receive the composition.



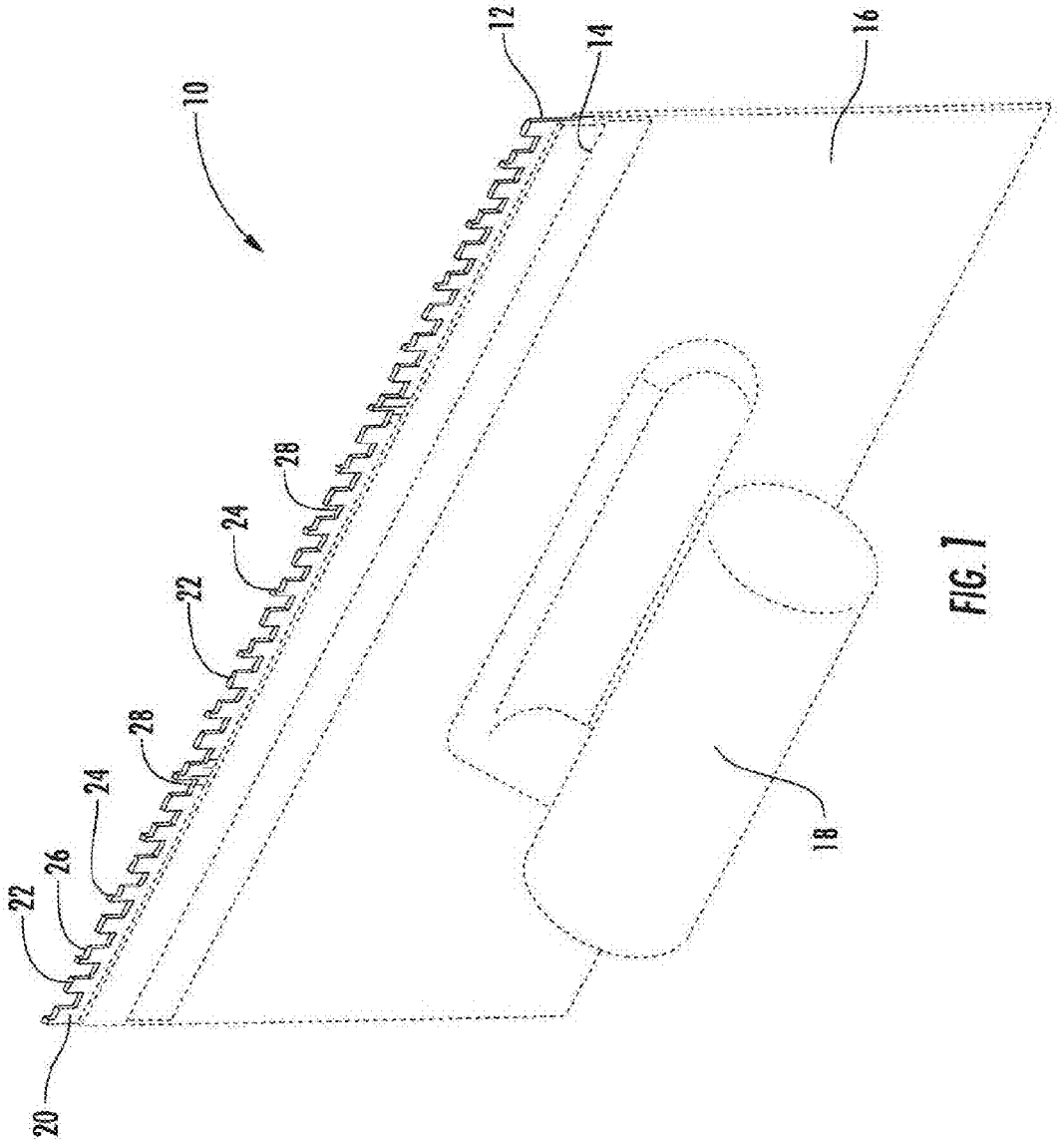


FIG. 1

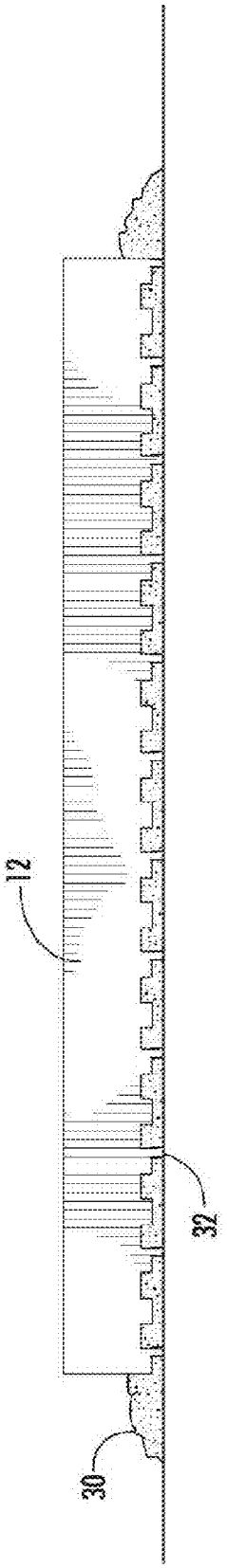


FIG. 2A

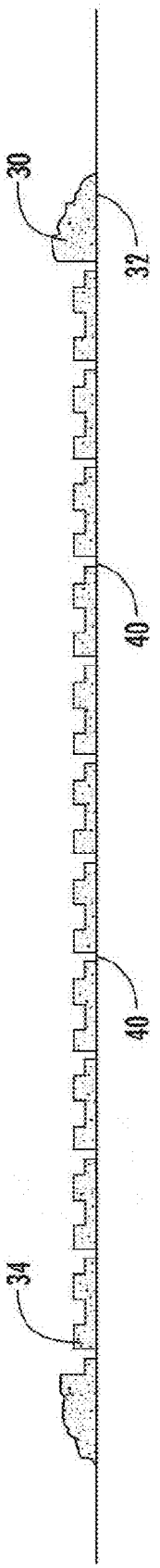


FIG. 2B

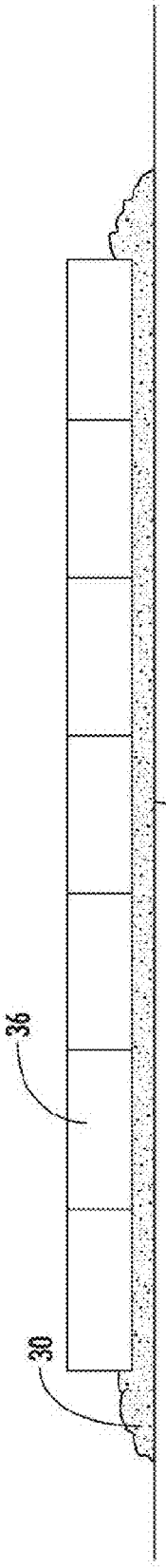
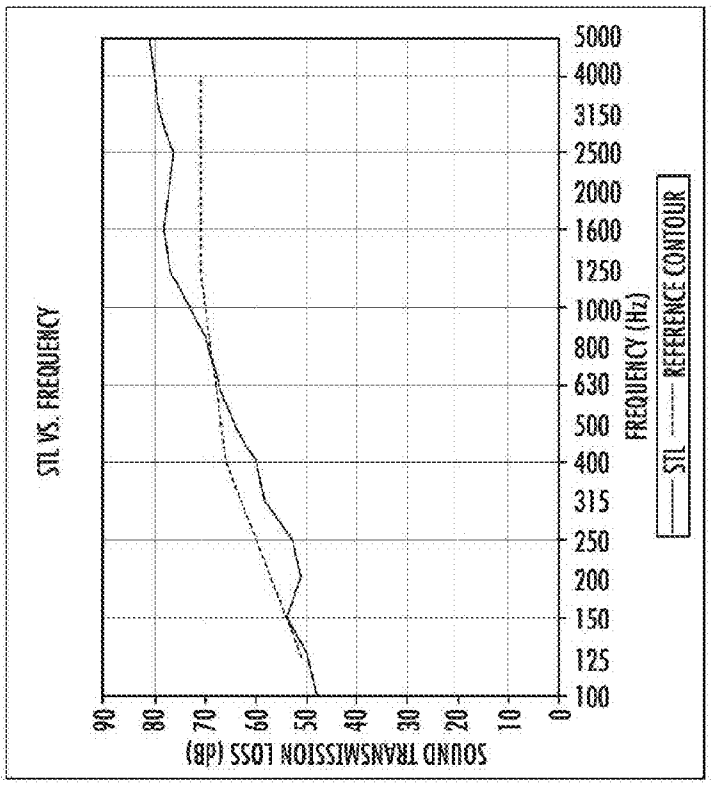


FIG. 2C

SOUND TRANSMISSION CLASS STC = 67 dB

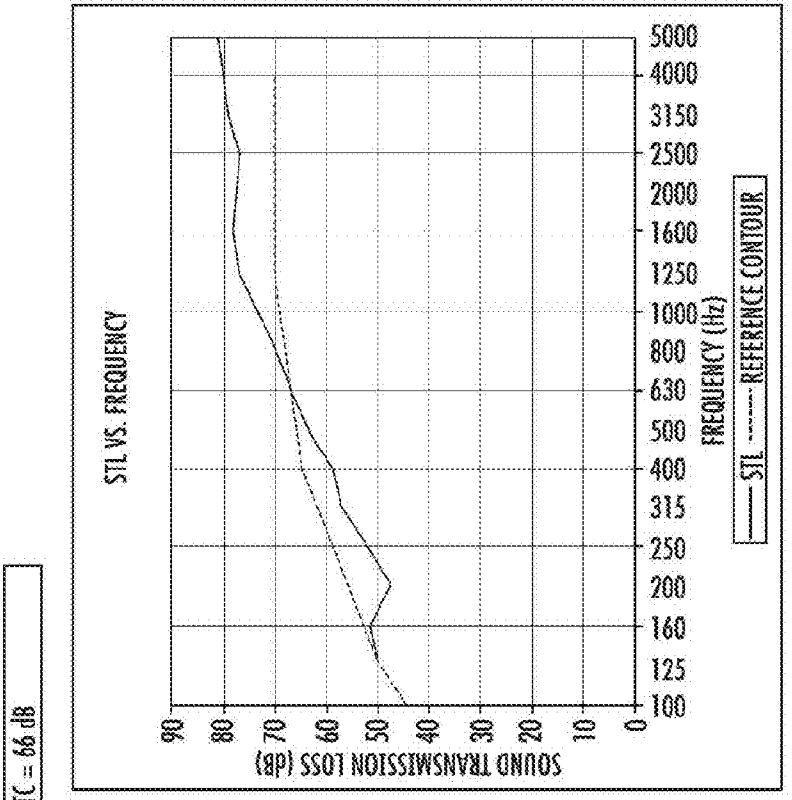
FREQUENCY [Hz]	STL [dB]	ΔSTL
100	48	3.441
125	50	1.015
160	54	2.020
200	51	0.872
250	53	0.728
315	58	0.574
400	60	0.361
500	64	0.510
630	67	0.173
800	69	0.557
1000	73	0.447
1250	77	0.458
1600	78	0.200
2000	77	0.361
2500	76	0.332
3150	79	0.300
4000	80	0.173
5000	81	0.374

* DUE TO HIGH INSULATING VALUE OF SPECIMEN, BACKGROUND LEVELS LIMIT RESULTS AT THESE FREQUENCIES.



STL = SOUND TRANSMISSION LOSS, dB
Δ STL = UNCERTAINTY FOR 95% CONFIDENCE LEVEL

FIG. 3

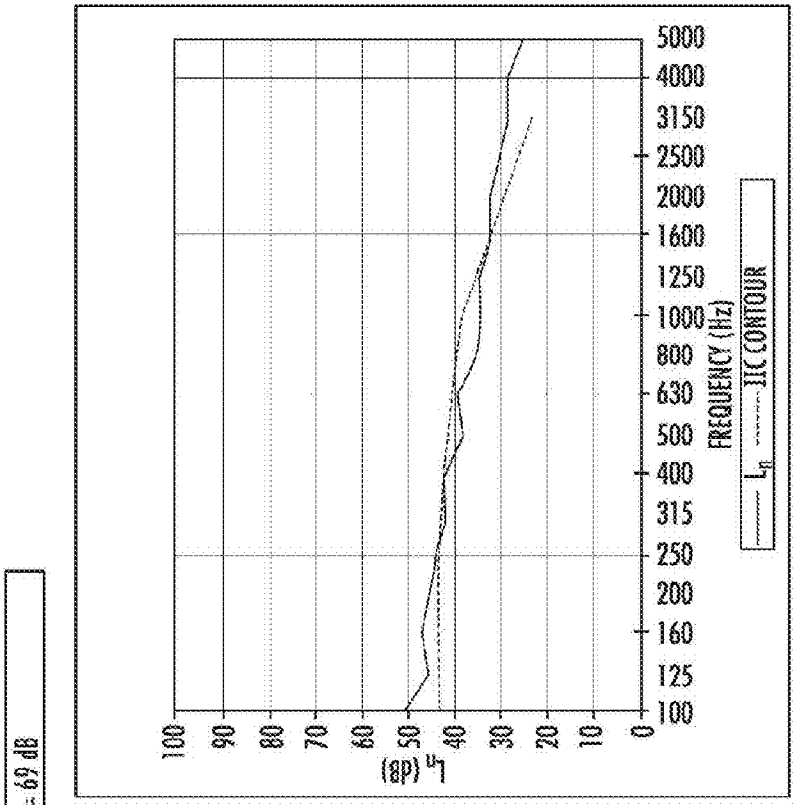


FREQUENCY (Hz)	STL (dB)	ΔSTL
100	45	3.033
125	50	0.990
160	52	1.982
200	48	1.100
250	52	0.539
315	57	0.469
400	59	0.566
500	64	0.500
630	67	0.283
800	70	0.447
1000	73	0.265
1250	77	0.332
1600	78	0.173
2000	78	0.316
2500	77	0.300
3150	79	0.283
4000	80	0.374
5000	81	0.316

* DUE TO HIGH INSULATING VALUE OF SPECIMEN, BACKGROUND LEVELS LIMIT RESULTS AT THESE FREQUENCIES.

STL = SOUND TRANSMISSION LOSS, dB
Δ STL = UNCERTAINTY FOR 95% CONFIDENCE LEVEL

FIG. 4

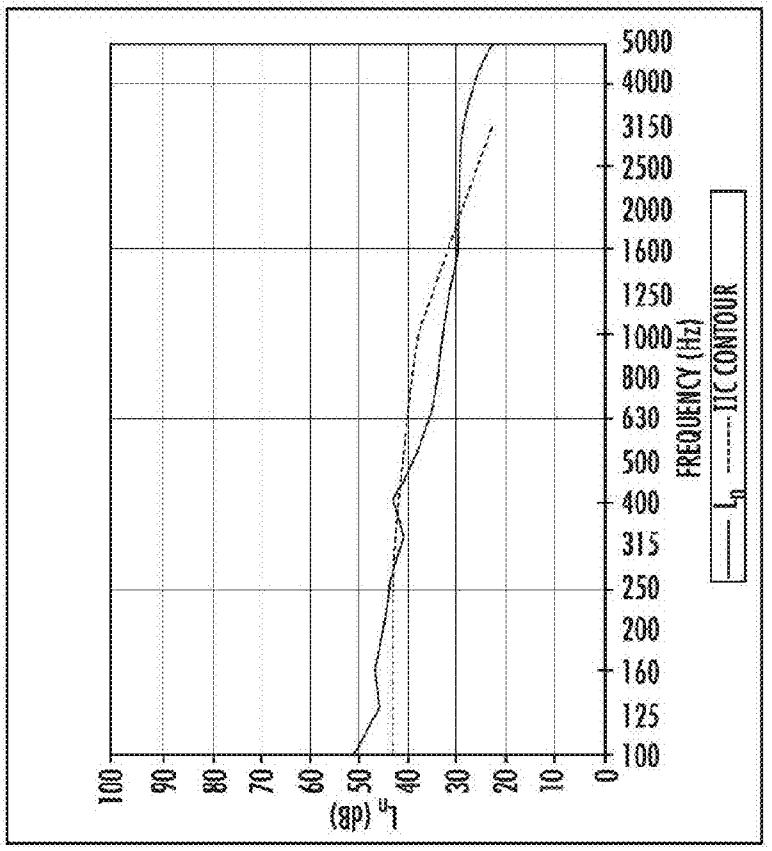


FREQUENCY (Hz)	L_n [dB]
100	51
125	46
160	47
200	45
250	44
315	42
400	42
500	38
630	39
800	35
1000	34
1250	34
1600	32
2000	32
2500	30
3150	28
4000	28
5000	25

* DUE TO HIGH INSULATING VALUE OF SPECIMEN, BACKGROUND LEVELS LIMIT RESULTS AT THESE FREQUENCIES.

FIG. 5

IMPACT INSULATION CLASS IIC = 69 dB



L_n = NORMALIZED SOUND PRESSURE LEVEL, dB

FREQUENCY [Hz]	L_n [dB]
100	51
125	46
160	47
200	45
250	44
315	41
400	43
500	39
630	36
800	34
1000	33
1250	32
1600	30
2000	30
2500	30
3150	29
4000	27
5000	23

* DUE TO HIGH INSULATING VALUE OF SPECIMEN, BACKGROUND LEVELS LIMIT RESULTS AT THESE FREQUENCIES.

FIG. 6

METHODS AND KITS FOR APPLICATION OF WOOD FLOORING

CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application claims is based on and claims priority to U.S. Provisional Application Ser. No. 61/095,395, filed Sep. 9, 2008, which is incorporated by reference herein in its entirety.

BACKGROUND

[0002] Wood flooring installation is typically a labor-intensive process which requires many steps to accomplish properly. For instance, the work surface to which the wood flooring is to be applied must often be sealed with a moisture barrier material prior to application of the wood flooring material. In some methods, an adhesive composition is first spread on the work surface, after which a moisture barrier underlayment is applied over the adhesive. In other methods, the adhesive composition itself is spread over the work surface and serves as the moisture barrier material. After the moisture barrier material is applied and allowed to dry, if necessary (which can take several hours), an adhesive composition can be applied over the moisture barrier material to join the wood flooring to the work surface. Hand trowels are typically used to distribute the composition(s) along the work surface such as subfloors. A typical trowel is made from a handle joined to a single, rectangular plate having at least one notched edge in the form of a square, u-notch, v-notch, saw-tooth configuration, or the like. Notches having a larger distance between them create a wider layer of material, and those having a smaller distance between the notches spread narrower layers of material.

[0003] In this regard, numerous adhesives are available in the market with each type of adhesive having particular end use characteristics for particular adherends. Currently available adhesives are based on a wide range of technologies, including elastomer/solvent/resin mixtures, epoxies, latexes, polyurethanes, silicones, cyanoacrylates, acrylics, modified-silanes, hot melts, as well as others. Each different type of adhesive has particular advantages and disadvantages under particular use conditions. However, as stated previously, most such compositions require multiple steps in order to apply wood flooring to a work surface.

[0004] Recently, certain modified-silane wood flooring adhesives have been marketed as so-called "one-step" products that can serve as both sealers and adhesives with a single application of material. Such products utilize a specially purchased trowel that includes a "pin" at the edge of one or more of the trowel teeth. In this manner, a portion of the work surface does not get covered by the composition when spread with such a trowel until a piece of wood flooring is positioned on the work surface for application, at which time the ridge of composition created by the trowel teeth is pressed down by the wood flooring and covers the uncovered portion of the work surface formed by the pin. However, a major shortcoming of such modified-silane compositions is that they often cost many times more than conventional materials. Furthermore, such "one-step" products have failed to gain widespread use and acceptance because the trowels are also costly to purchase and typically need replacement with every bucket of material due to the pin becoming worn.

[0005] The present inventors have applied for and received design patents for trowels and trowel replacement blades having rectangular-shaped notches on one or more rectangular-shaped teeth. The expectation was that such trowels would allow conventional materials to be utilized for one-step application. However, it has been determined that conventional materials lack the proper viscosity to be utilized with such trowels. Furthermore, conventional materials also lack various attributes that would make a one-step treatment more appealing to the wood flooring industry.

[0006] As such, a need exists for a method that allows for one-step application of sealer and adhesive compositions that is both cost-effective while also providing various additional benefits. A kit that incorporates such features would be particularly beneficial.

SUMMARY

[0007] In accordance with one embodiment of the present disclosure, a method for applying an adhesive and sealer composition is described in which a composition is spread over a surface with a trowel. The composition can include either a moisture-curing urethane composition or an acrylic composition. The moisture-curing urethane composition includes petroleum distillate in an amount of from about 2 weight percent to about 12 weight percent and polymeric isocyanate in an amount of from about 0.1 weight percent to about 3 weight percent. The acrylic composition includes acrylic polymer in an amount of from about 8 weight percent to about 42 weight percent and an alkanolamine in an amount of from about 0.05 weight percent to about 0.5 weight percent. The trowel includes a blade having an application edge defining a plurality of generally rectangular teeth, at least one of the teeth including an integrally connected projection extending from the bottom edge of the at least one tooth, the trowel blade configured to spread the composition across the surface with the projection causing a portion of the surface to not receive the composition. The method further includes the step of applying wood flooring material onto the composition, the composition configured to form an adhesive bond between the surface and the wood flooring material with application of the wood floor causing the composition to spread across the portion of the surface that did not receive the composition.

[0008] In another embodiment of the present disclosure, a kit is described which includes a moisture-curing urethane composition comprising petroleum distillate in an amount of from about 2 weight percent to about 12 weight percent and polymeric isocyanate in an amount of from about 0.1 weight percent to about 3 weight percent. The kit also includes a trowel blade, the blade having an application edge defining a plurality of generally rectangular teeth, at least one of the teeth including an integrally connected projection extending from the bottom edge of the at least one tooth. The trowel blade is configured to spread the composition across a surface with the projection causing a portion of the surface to not receive the composition. The composition is configured to form an adhesive bond between the surface and wood flooring material with application of the wood flooring material causing the composition to spread across the portion of the surface that did not receive the composition.

[0009] In still another embodiment of the present disclosure, a kit is described which includes an acrylic composition comprising acrylic polymer in an amount of from about 8 weight percent to about 42 weight percent and an alkanola-

mine in an amount of from about 0.05 weight percent to about 0.5 weight percent. The kit also includes a trowel blade, the blade having an application edge defining a plurality of generally rectangular teeth, at least one of the teeth including an integrally connected projection extending from the bottom edge of the at least one tooth. The trowel blade is configured to spread the composition across a surface with the projection causing a portion of the surface to not receive the composition. The composition is configured to form an adhesive bond between the surface and wood flooring material with application of the wood flooring material causing the composition to spread across the portion of the surface that did not receive the composition.

[0010] Other features and aspects of the present disclosure are discussed in greater detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] A full and enabling disclosure, including the best mode thereof, directed to one of ordinary skill in the art, is set forth more particularly in the remainder of the specification, which makes reference to the appended figure in which:

[0012] FIG. **1** illustrates a perspective view of a trowel in accordance with one embodiment of the present disclosure;

[0013] FIGS. **2**A-**2**C illustrate a method for applying an adhesive and sealer composition in accordance with the present disclosure;

[0014] FIG. **3** illustrates results from acoustical tests conducted under ASTM E90-04/ASTM E413-04 for an acrylic adhesive and sealer composition in accordance with the present disclosure;

[0015] FIG. **4** illustrates results from acoustical tests conducted under ASTM E90-04/ASTM E413-04 for a urethane adhesive and sealer composition in accordance with the present disclosure;

[0016] FIG. **5** illustrates results from acoustical tests conducted under ASTM E492-04/ASTM 989-89 for an acrylic adhesive and sealer composition in accordance with the present disclosure; and

[0017] FIG. **6** illustrates results from acoustical tests conducted under ASTM E492-04/ASTM 989-89 for a urethane adhesive and sealer composition in accordance with the present disclosure.

[0018] Repeat use of reference characters in the present specification and drawings is intended to represent same or analogous features or elements of the disclosure.

DETAILED DESCRIPTION

[0019] Reference now will be made in detail to various embodiments of the disclosure, one or more examples of which are set forth below. Each example is provided by way of explanation of the disclosure, not limitation of the disclosure. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present disclosure without departing from the scope or spirit of the disclosure. For instance, features illustrated or described as part of one embodiment, can be used on another embodiment to yield a still further embodiment. Thus, it is intended that the present disclosure covers such modifications and variations as come within the scope of the appended claims and their equivalents.

[0020] The present disclosure is generally directed to kits and methods for application of hardwood flooring. The present inventors have discovered compositions that can be applied with certain trowels as described herein so as to enable one-step application of an adhesive and sealer composition that functions at least as well as traditional two-step systems. Importantly, the compositions described herein can also include various other benefits when compared with traditional compositions. Furthermore, the compositions described herein can be manufactured at significantly less cost than other recently introduced one-step systems. In addition, the kits described herein contemplate a composition provided with a trowel blade to compensate for wear that occurs to the notch of the trowel blade from application of the composition to a work surface, such as a subfloor. In this regard, trowel wear can be a significant issue that the present disclosure attempts to address.

[0021] The kits and methods described herein provide subfloor moisture protection. In addition, acoustical values are provided that meet or exceed multi-level condo standards (STC and IIC). For instance, in certain embodiments of the present disclosure, acoustical values are greatly improved utilizing the kits and methods described herein. The kits and methods described herein can replace multiple step installation of traditional acoustical systems such as cork, foam, recycled rubber or the like, thereby reducing installation time, materials, and other such costs. The composition also serves as a crack suppressant and provides anti-microbial protection.

[0022] Referring to FIG. **1**, an example of a trowel **10** having a blade **12** suitable for use in connection with the compositions of the present disclosure is illustrated. The trowel blade **12** is inserted into a trowel housing **14** defined by rectangular plate **16** which is joined to handle **18**. The trowel blade **12** can be held in place in housing **14** by any suitable fastening device or the like as would be understood by one of ordinary skill in the art. The present disclosure also contemplates that the trowel blade can be joined to a trowel in any other suitable manner. For instance, in certain embodiments it is contemplated that a trowel blade is connected directly to a trowel handle by any suitable fastening device as would be understood in the art.

[0023] Turning again to FIG. **1**, trowel blade **12** has an application edge **20** defining a plurality of generally rectangular teeth **22** with gaps **28** between such teeth **22**. As illustrated, one or more of the teeth **22** include an integrally connected projection or notch **24** extending from the bottom edge **26** of the tooth **22**. The various dimensions of the trowel blade **12** can be of any suitable shape and size as would be known in the art. Suitable trowel blades for use with the present disclosure are shown in U.S. Pat. No. Des. 561,549 to Hughett and U.S. application Ser. Nos. 29/295,090 and 29/295,096, which are both incorporated by reference herein.

[0024] Referring to FIGS. **2**A and **2**B, as the trowel blade spreads a composition **30** of the present disclosure across a surface **32** (see FIG. **2**A), the composition **30** forms ridges **34** that generally take the shape of the gaps **28** between teeth **22** (see FIG. **2**B). Surface **32** can be any surface as would be known in the art such as subfloors (including, but not limited to, concrete, wood, plywood, or oriented strand board), walls, or the like. Notch **24** prevents the bottom edges **26** of teeth **22** from coming into contact with surface **32**. As such, the composition **30** forms a layer **36** adjacent to ridges **34** that is approximately the same thickness as the length of notch **24**. In this manner, the trowel blade can spread the composition **30** across a surface **32** with the notch **24** causing a portion of the surface **40** to not receive the composition **30**. However, the portion of the surface **40** that does not receive the composition

30 is quite small in comparison to the portion of the surface that does receive the composition.

[0025] As illustrated in FIG. **2**C, upon application of wood flooring material **36**, the composition **30** is configured to form an adhesive bond between the surface **32** and wood flooring material **36**. In this regard, any suitable wood flooring material as would be known in the art is contemplated for use with the present disclosure. For example, suitable wood flooring materials include wood planks, engineered wood products, parquet flooring, wood-block flooring, or laminate wood flooring. The application of the wood flooring material **36** causes the composition **30** to spread across the portion of the surface **40** that previously had not received the composition. In this manner, only a single application step is necessary for the surface to be sealed and also form an adhesive bond with the wood flooring material.

[0026] Turning now to compositions suitable for use in connection with the present disclosure, certain compositions have been developed that allow for one-step application using the methods previously discussed.

[0027] For instance, a moisture-cure polyurethane composition has been developed in accordance with the present disclosure. The urethane prepolymers useful in accordance with the present disclosure have an average isocyanate functionality sufficient to allow the preparation of a crosslinked polyurethane upon cure but not so high that the prepolymers are unstable. Stability refers to the prepolymer or composition prepared from the prepolymer having a shelf life of at least about 6-12 months at ambient temperatures, in that it does not demonstrate an increase in viscosity during such period which prevents its application or use. As will be discussed in greater detail, viscosity is of importance in the compositions of the present disclosure.

[0028] Polymeric isocyanates are present in the moisture-cure polyurethane composition of the present disclosure in an amount of from about 0.1 to about 5 weight percent, and more particularly in an amount of from about 0.1 to about 3 weight percent. Preferable polyisocyanates for use in preparing the prepolymer include any aliphatic, cycloaliphatic, arylaliphatic, heterocyclic or aromatic polyisocyanate, or mixture thereof. Examples of such polyisocyanates can include ethylene diisocyanate, 1,4-tetramethylene diisocyanate, 1,6-hexamethylene diisocyanate, 1,12-dodecane diisocyanate, cyclobutane-1,3-diisocyanate, cyclohexane-1,3- and 1,4-diisocyanate and mixtures of these isomers; 1-isocyanato-3,3,5-trimethyl-5-isocyanato methyl cyclohexane; 2,4- and 2,6-hexahydrotolylene diisocyanate and mixtures of these isomers, hexahydro-1,3- and/or 1,4-phenylene diisocyanate, perhydro-2,5'- and/or 4,4'-diphenyl methane diiso-cyanate, 1,3- and 1,4-phenylene diisocyanate, 2,4- and 2,6-tolylene diisocyanate and mixtures of these isomers, diphenyl methane-2,4'- and/or 4,4'-diisocyanate, naphthylene-1,5-diisocyanate, triphenyl methane-4,4',4"-triisocyanate, or the like.

[0029] The moisture-cure polyurethane composition of the present disclosure further includes polymer and filler in an amount of from about 65 weight percent to about 95 weight percent, and more particularly in an amount of from about 70 weight percent to about 90 weight percent.

[0030] For instance, the polymer can include isocyanate-reactive compounds. Preferable isocyanate-reactive compounds are polyols. The term polyol as used herein includes any organic compound having on average more than one and preferably at least about two, and preferably no more than about four, isocyanate-reactive hydroxyl moieties. Preferable polyols useful in the preparation of the prepolymers include, for example, polyether polyols, polyester polyols, poly(alkylene carbonate)polyols, hydroxyl-containing polythioethers, polymer polyols, and mixtures thereof. Polyether polyols are well-known in the art and include, for example, polyoxyethylene, polyoxypropylene, polyoxybutylene, and polytetramethylene ether diols and triols which are prepared by reacting an unsubstituted or halogen- or aromatic-substituted alkylene oxide with an initiator compound containing two or more active hydrogen groups such as water, ammonia, a polyalcohol, or an amine.

[0031] Filler material can include reinforcing fillers. Such fillers are well known to those skilled in the art and include carbon black, titanium dioxide, calcium carbonate, surface treated silicas, titanium oxide, fumed silica, talc, and the like. In certain embodiments, more than one reinforcing filler can be used. The reinforcing fillers are used in sufficient amount to increase the strength of the composition and to provide thixotropic properties to the composition.

[0032] The composition can further include a plasticizer present in an amount from about 0.1 weight percent to about 15 weight percent and more particularly from about 0.1 weight percent to about 10 weight percent. The plasticizer should be free of water, inert to isocyanate groups and compatible with a polymer. Suitable plasticizers are well known in the art and can include alkyl phthalates such as dioctylphthalate or dibutylphthalate, partially hydrogenated terpene, trioctyl phosphate, epoxy plasticizers, toluene-sulfamide, chloroparaffins, adipic acid esters, castor oil, toluene and alkyl naphthalenes. The plasticizer can give rheological properties to the composition and disperse the prepolymer in the final composition.

[0033] The composition also includes a petroleum distillate in an amount of from about 1 weight percent to about 15 weight percent and more specifically, more specifically from about 2 weight percent to about 12 weight percent, still more specifically from about 5 weight percent to about 10 weight percent. It is believed that the petroleum distillate assists in providing the desired viscosity of the composition.

[0034] The moisture-cure polyurethane composition of the present disclosure can further comprise a catalyst known for promoting the cure of polyurethanes in the presence of moisture. Such catalysts can include metal salts such as tin carboxylates, organo silicon titanates, alkyl titanates, bismuth carboxylates, and dimorpholinodiethyl ether or alkyl-substituted dimorpholinodiethyl ethers. Still other catalysts include bismuth octoate, dimorpholinodiethyl ether and (di-(2-(3,5-dimethylmorpholino)ethyl)) ether.

[0035] The composition of the present disclosure can further comprise stabilizers which function to protect the composition from moisture, thereby inhibiting advancement and preventing premature crosslinking of the isocyanates in the formulation. Such stabilizers can include diethylmalonate and alkylphenol alkylates.

[0036] The composition can further comprise a thixotrope. Such thixotropes are well known to those skilled in the art and include alumina, limestone, talc, zinc oxides, sulfur oxides, calcium carbonate, perlite, slate flour, salt (NaCl), cyclodextrin and the like. The thixotrope can further be added to the composition in a sufficient amount to give the desired rheological properties.

[0037] Other components commonly used in similar adhesive compositions can be used in the adhesive composition of the present disclosure. Such materials are well known to those skilled in the art and can include ultraviolet absorbers and stabilizers, antioxidants, catalysts, lubricants, extenders, biocides, and the like.

[0038] Another suitable composition that has been developed in accordance with the present disclosure is an acrylic composition.

[0039] The acrylic composition of the present disclosure includes an acrylic polymer that is present in an amount of from about 5 weight percent to about 45 weight percent, more

particularly from about 10 weight percent to about 40 weight percent. Suitable acrylic polymers are not particularly limited, and can be selected for use from various monomers. Examples thereof include acrylic acid monomers such as the following (meth) acrylic acid monomers: (meth) acrylic acid, methyl (meth)acrylate, ethyl (meth)acrylate, n-propyl (meth) acrylate, isopropyl (meth)acrylate, n-butyl (meth)acrylate, isobutyl (meth)acrylate, tert-butyl (meth)acrylate, n-pentyl (meth)acrylate, n-hexyl (meth)acry late, cyclohexyl (meth) acrylate, n-heptyl (meth)acrylate, n-octyl (meth)acrylate, 2-ethylhexyl (meth)acrylate, nonyl (meth)acrylate, decyl (meth)acrylate, dodecyl (meth)acrylate, phenyl (meth)acrylate, toluoyl (meth)acrylate, benzyl (meth)acry late, 2-methoxyethyl (meth)acrylate, 3-methoxybutyl (meth)acrylate, 2-hydroxyethyl (meth)acrylate, 2-hydroxypropyl (meth) acrylate, stearyl (meth)acrylate, glycidyl (meth)acrylate, 2-aminoethyl (meth)acrylate, γ-(methacryloyloxypropyl)trimethoxysilane, γ-(methacryloyloxypropyl)dimethoxymethylsialne, an ethylene oxide adduct of (meth)acrylic acid, trifluoromethylmethyl (meth)acrylate, 2-trifluoromethylethyl (meth)acrylate, 2-perfluoroethylethyl (meth)acrylate, 2-perfluoroethyl-2-perfluorobutylethyl (meth)acrylate, perfluoroethyl (meth)acrylate, trifluoromethyl (meth)acrylate, bis(trifluoromethyl)methyl (meth)acrylate, trifluoromethylperfluoroethylmethyl (meth)acrylate, 2-perfluorohexylethyl (meth)acrylate, 2-perfluorodecylethyl (meth)acrylate, 2-perfluorohexadecylethyl (meth)acrylate, and other (meth) acrylic acid monomers.

[0040] The composition can further includes a vinyl acetate copolymer in an amount of from about 5 weight percent to about 20 weight percent. Any suitable vinyl acetate copolymer can be utilized including DUR-O-SET® brand polymer sold by the Celanese Corporation.

[0041] The acrylic composition of the present disclosure can also include a styrene-butadiene polymer in an amount of from about 5 weight percent to about 20 weight percent. Any suitable styrene-butadiene polymer can be utilized including Firestone STEREON® brand polymer sold by Firestone Polymers.

[0042] The acrylic composition also includes a softener in an amount of from about 10 weight percent to about 30 weight percent. The softener, which serves to improve the flexibility and fluidity of the composition, is provided by petroleum fractions of high boiling point such as mineral oil, for example, paraffinic process oil, naphthenic process oil, aromatic process oil, liquid paraffin, white oil and petrolatum as well as by vegetable oils such as castor oil, cotton seed oil, linseed oil, and rape seed oil. A mineral oil, particularly, naphthenic process oil is well compatible with the composition of the present disclosure.

[0043] Tackifying resins or tackifiers can be used in the acrylic compositions of the present disclosure including those which extend adhesive properties and improve specific adhesion. As used herein, the term "tackifying resin" includes:

[0044] (a) aliphatic and cycloaliphatic petroleum hydrocarbon resins;

[0045] (b) Aromatic petroleum hydrocarbon resins and the hydrogenated derivatives thereof;

[0046] (c) Aliphatic/aromatic petroleum derived hydrocarbon resins and the hydrogenated or acid functionalized derivatives thereof;

[0047] (d) Aromatic modified cycloaliphatic resins and the hydrogenated derivatives thereof;

[0048] (e) Polyterpene resins;

[0049] (f) Copolymers and terpolymers of natural terpenes, e.g. styrene/terpene, α-methyl styrene/terpene and vinyl toluene/terpene;

[0050] (g) natural and modified rosin such as, for example, gun rosin, wood rosin, tall-oil rosin, distilled rosin, hydrogenated rosin, dimerized rosin and polymerized rosin;

[0051] (h) glycerol and pentaerythritol esters of natural and modified rosin, such as, for example, the glycerol ester of pale wood rosin, the glycerol ester of hydrogenated rosin, the glycerol ester of polymerized rosin, the pentaerythritol ester of pale wood rosin, the pentaerythritol ester of hydrogenated rosin, the pentaerythritol ester of tall-oil rosin, and the phenolic modified pentaerythritol ester of rosin; and

[0052] (i) phenolic-modified terpene resins such as, for example, the resin product resulting from the condensation in an acidic medium of a terpene and a phenol.

[0053] Mixtures of two or more of the above described tackifying resins may be required for some formulations. Although a range of about 20% to 65% by weight tackifying resin may be used, the preferred amount is from about 25% to about 60% by weight. For example, modified rosin can be present in an amount of from about 1 weight percent to about 10 weight percent while hydrocarbon resin is present in an amount of from about 5 weight percent to about 20 weight percent.

[0054] As discussed previously with respect to polyurethane compositions, the acrylic composition can further comprise a thixotrope in an amount from about 15 weight percent to about 55 weight percent. In the present acrylic composition, ground limestone is preferred though any of the previously discussed thixotropes can be utilized.

[0055] The acrylic composition of the present disclosure also includes alkanolamines in an amount of from about 0.05 weight percent to about 0.5 weight percent and more specifically from about 0.1 weight percent to about 0.4 weight percent. It is believed that the alkanolamines assist in providing the desired viscosity of the composition.

[0056] As with the polyurethane compositions described herein previously, other components can be used in the acrylic compositions of the present disclosure. Such materials are well known to those skilled in the art and can include ultraviolet absorbers and stabilizers, surfactants, antioxidants, catalysts, lubricants, extenders, biocides, and the like.

[0057] With respect to all of the compositions previously described, such compositions can be formulated by blending components together as would be known in the art.

[0058] It has been determined that the compositions described herein can be advantageously utilized with the trowel blade described herein for one-step application of wood flooring material. In this regard, the compositions described herein have a viscosity of from about 130,000 cps to about 160,000 cps and more particularly from about 140,000 cps to about 155,000 cps. Such a viscosity allows the composition(s) to be applied beneficially utilizing the trowel blade of the present disclosure.

[0059] It is contemplated by the present inventors that the compositions and trowels described herein can be provided in a kit. Advantageously, each kit can include a trowel blade with the composition provided in a bucket or any similar suitable container so that a new trowel blade is provided with each container of material. In this manner, a user will not have to purchase an entire replacement trowel each time the trowel becomes worn but, rather, will be provided with the trowel blade which is more cost-effective. Indeed, because the notch features on each trowel blade are quite small, they are prone to wearing out after repeated use. Therefore, it is very helpful for replacement trowel blades to be provided with each container of composition. In this regard, the trowel can be affixed to the container or can be provided in combination with the container in any suitable manner.

[0060] The present disclosure can be better understood with reference to the following examples.

EXAMPLES

Acrylic Composition Formula:

[0061]

Acrylic Polymer	10-40%
Vinyl Acetate Copolymer	5-20%
Styrene/Butadiene Copolymer	5-20%
Surfactants	<1%
Alkanolamines	<1%
Glycol	<1%
Antimicrobials/Bactericides	<1%
Ground Limestone	20-50%
Naphthenic Process Oil	10-30%
Modified Rosin	1-10%
Hydrocarbon Resin	5-20%

Moisture-Cure Urethane Composition Formula:

[0062]

Polymer - Filler	74-87%
Plasticizer	0-10%
Petroleum Distillates	5-10%
Polymeric Isocyanate	0-2%

Comparison of Viscosity of Subject Compositions with Traditional Compositions:

[0063] Acrylic Wood Flooring Adhesives

[0064] Taylor 2071—248,000 cps

[0065] Bruce Everbond—168,000 cps

[0066] Para-Chem Composition—155,000 cps

[0067] Urethane Wood Flooring Adhesives

[0068] Bostik's Best—220,000 cps (Online Data)

[0069] Franklin Titebond 821—Typical 100,000 cps

[0070] Para-Chem Composition—140,000 cps

[0071] Para-Chem viscosity tests on Brookfield Viscometer with Helipath (Spindle# TC@5 RPM)

Cost Comparison of Subject Compositions with Traditonal Compositions:

TABLE I

	Traditional Acrylic Glue Down	Embodiment of Acrylic Composition	Traditional Urethane Glue Down	Embodiment of Urethane Composition	Traditional 2-Step Sealer/Glue	Cost of Failed Floor (Traditional Install × 2)
Cost of Sealer	NA	Included	NA	Included	$0.48	NA
Cost of Adhesive	$ 0.30	$ 0.45	$ 0.38	$ 0.63	$0.37	$ 0.44
Labor to Apply Sealer	NA	One Application	One Application	One Application	$1.50	NA
Labor to Apply Adhesive	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$2.50	$ 5.00
Total for Installation Materials (per sq ft)	$ 2.80	$ 2.95	$ 2.88	$ 3.13	$4.95	$ 5.44
Cost of Wood (avg per sp ft)	$ 8.00	$ 8.00	$ 8.00	$ 8.00	$8.00	Orig. $8.00 Replacement $8.00
Removal Cost of Failure	NA	NA	NA	NA	NA	$4.00/sqft.
Matching Moldings (avg per sq ft flooring)	$ 0.30	$ 0.30	$ 0.30	$ 0.30	$0.30	$ 0.30
Total Cost (per sq ft)	$11.10	$11.25	$11.18	$11.43	$13.15	$25.74

*The above figures were based on wholesale cost of sealers, adhesives, compositions and retail for wood flooring and average labor rates as of six months of filing

[0072] These results indicate that the total cost per sq. ft. is significantly less for the Acrylic composition and the Urethane composition made in accordance with the present disclosure when compared to traditional methods.

Moisture Emissions Test Results:

[0073]

TABLE II

Test Site	Sq. Feet Installed	Moisture Emissions @ Installation - Pounds/Moisture - Per 24 Hours/ ASTM F-1869	Type of 2N1	Type of Flooring	Wood Moisture Content at Time of Installation	Wood Moisture Content After 90 Days	Visual and Physical Floor Appearance After 6 Months**
A	616	10.7	Acrylic	Engineered	8.0	6.5	**
B	550	9.5	Urethane	Solid	9.0	7.0	**
C	661	8.8	Acrylic	Engineered	8.5	6.5	**
D	840	13.6	Acrylic	Engineered	8.5	7.0	**

TABLE II-continued

Test Site	Sq. Feet Installed	Moisture Emissions @ Installation - Pounds/Moisture - Per 24 Hours/ ASTM F-1869	Type of 2N1	Type of Flooring	Wood Moisture Content at Time of Installation	Wood Moisture Content After 90 Days	Visual and Physical Floor Appearance After 6 Months**
E	237	11.7	Acrylic	Engineered	8.0	7.0	**
F	460	7.8	Acrylic	Engineered	9.5	6.5	**
G	310	13.7	Acrylic	Engineered	8.5	6.5	**
H	415	8.9	Urethane	Solid	9.0	6.5	**
I	390	12.2	Acrylic	Engineered	9.0	6.5	**
J	470	9.4	Urethane	Solid	8.0	6.5	**
K	515	10.7	Acrylic	Engineered	8.5	6.5	**
L	540	11.8	Acrylic	Engineered	8.5	7.0	**
M	410	10.6	Urethane	Solid 5/16"	8.0	8.5	**
N	380	9.8	Urethane	Solid 5/16"	8.5	8.0	**
O	308	10.1	Acrylic	Engineered	7.5	7.5	**
P	545	12.3	Acrylic	Engineered	6.5	8.5	**
Q	430	9.8	Urethane	Solid	8.0	8.5	**
R	394	9.2	Acrylic	Engineered	8.5	7.5	**

[0074] These results indicate no moisture damage after testing.

Accoustical Test Data:

[0075] Test Method: This test method conforms explicitly with the American Society for Testing and Materials Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements—Designation: E 90-04/E 413-04.

[0076] Specimen Description: 6 inch (152 mm) Concrete Slab Overlaid with Engineered Maple Plank Special Hardwood Flooring Adhered with 2N1 Acrylic Sealer/Adhesive with suspended gypsum board ceiling.

[0077] The test specimen was a floor-ceiling assembly consisting of the following:

[0078] 1 layer of 11.1 mm×76.2 mm×random length (7/16 in.×3 in.×random length) planks.

[0079] 9.37 kg/m2 (1.92 PSF).

[0080] ID: Engineered Maple Plank Special Hardwood Flooring (M3 8 10 -M34 10) Flooring glued down with:

[0081] 1 layer of 2N1 Acrylic Sealer/Adhesive (SCA 7 1-0 19, installed with 311 6 in. IJF Trowel Blade.

[0082] 88.9 mm (3-112 in.) fiberglass unfaced batt insulation. Sample weight was 0.68 kg/m^2 (0.23 PSF). The insulation was laid over the suspended grid system.

[0083] Gypsum board ceiling grid suspension system manufactured by Armstrong. System is comprised of Main Tee's (PN HD8906E) and Cross Tee's (PN XL8945P). The Main Tee's were 1218 mm (48 in.) O.C. and the Cross tee's were 609 mm (24 in.) O.C. 16 gauge galvanized tie wire was used to attach the Main Tee's to concrete anchors, located 1219 mm (48 in.) O.C. along the longitudinal axis, suspending the grid 305 mm (12 in.) below the concrete slab.

[0084] 1 layer of 15.91 nm (518 in.) Type X gypsum board. Sample was observed to be 15.7 mm (0.632 in.) thick and weighed 11.2 kglm2 (2.3 PSF). The board was attached 304.8 mm (12 in.) O.C. perpendicular to suspended grid suspension system mains, using 25.4 mm (1 in.) fine thread bugle head drywall screws. The board joints were taped.

[0085] 1521 nm (6 in.) thick reinforced concrete slab 366.1 kglm2 (75.0 PSF).

[0086] The overall weight of the test assembly is 387.9 kg/m2 (79.45 PSF).

[0087] The perimeter of the concrete slab was sealed with rubber gasketing and a sand filled trough. The test assembly is structurally isolated from the receiving room.

[0088] Specimen size: 3658 mm×4877 mm (12 R×16 ft.)

[0089] Conditioning: Concrete slab cured for a minimum of 28 days. Adhesive cured for a minimum of 16 hours.

[0090] Results are indicated in Table III below and FIG. **3**.

TABLE III

Source room	Receiving room
Volume V = 53.2 m^2	Volume V = 60.0 m^2
Temperature [° C.]: 20.5	Temperature [° C.]: 21.4
Humidity [%]: 59	Humidity [%]: 51

Sound Transmission Class STC = 67 dB
Sum of unfavorable deviations: 29.0 dB
Max. unfavorable deviation: 7.0 dB at 250 Hz

Frequency [Hz]	STL [dB]	L1 [dB]	L2 [dB]	T [s]	Corr. [dB]	u. Dev. [dB]	ΔSTL
100	48	101.2	59.5	2.06	5.8	-.-	3.441
125	50	99.9	56.5	2.54	6.7	1	1.015
160	54	103.5	57.2	3.27	7.8	-.-	2.020
200	51	99.5	56.6	3.27	7.8	6	0.872
250	53	102.0	57.0	3.32	7.9	7	0.728
315	58	104.6	54.3	3.14	7.6	5	0.574
400	60	102.9	50.1	3.09	7.6	6	0.361
500	64	100.2	43.2	2.87	7.3	3	0.510
630	67	99.6	39.4	2.67	6.9	1	0.173
800	69	99.2	37.1	2.72	7.0	-.-	0.557
1000	73	98.5	32.2	2.56	6.8	-.-	0.447
1250	77	98.1	27.6	2.31	6.3	-.-	0.458
1600	78	98.9	26.6	2.22	6.1	-.-	0.200
2000	77	99.3	27.5	1.91	5.5	-.-	0.361
2500	76	100.5	29.4	1.76	5.1	-.-	0.332
3150	79	100.2	26.1	1.66	4.9	-.-	0.300
4000	80	99.8	24.0	1.49	4.4	-.-	0.173
5000	81	99.4	22.0	1.33	3.9	-.-	0.374

STL = Sound Transmission Loss, dB
L1 = Source Room Level, dB
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
ΔSTL = Uncertainty for 95% Confidence Level

[0091] Identical tests were conducted with urethane adhesive in accordance with the present disclosure and similar results were achieved as evidenced by Table IV and FIG. **4**.

TABLE IV

Source room	Receiving room
Volume V = 53.2 m^3	Volume V = 60.0 m^3
Temperature [° C.]: 22.3	Temperature [° C.]: 22.3
Humidity [%]: 47	Humidity [%]: 49

Sound Transmission Class STC = 66 dB
Sum of unfavorable deviations: 29.0 dB
Max. unfavorable deviation: 8.0 dB at 200 Hz

Frequency [Hz]	STL [dB]	L1 [dB]	L2 [dB]	T [s]	Corr. [dB]	u. Dev. [dB]	ΔSTL
100	45	98.9	60.1	2.06	5.8	-.-	3.033
125	50	98.7	55.6	2.54	6.7	-.-	0.990
160	52	101.6	57.4	3.27	7.8	1	1.982
200	48	97.9	57.6	3.27	7.8	8	1.100
250	52	99.8	56.1	3.32	7.9	7	0.539
315	57	102.3	53.0	3.14	7.7	5	0.469
400	59	99.9	48.8	3.09	7.6	6	0.566
500	64	97.6	41.3	2.87	7.3	2	0.500
630	67	98.0	38.3	2.67	7.0	-.-	0.283
800	70	98.7	35.9	2.72	7.0	-.-	0.447
1000	73	97.7	31.2	2.56	6.8	-.-	0.265
1250	77	97.4	27.0	2.31	6.3	-.-	0.332
1600	78	97.4	25.7	2.22	6.1	-.-	0.173
2000	78	97.8	25.7	1.91	5.5	-.-	0.316
2500	77	99.4	27.4	1.76	5.1	-.-	0.300
3150	79	99.1	24.7	1.68	4.9	-.-	0.283
4000	80	98.6	22.8	1.49	4.4	-.-	0.374
5000	81	98.3	21.2	1.33	3.9	-.-	0.316

STL = Sound Transmission Loss, dB
L1 = Source Room Level, dB
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
ΔSTL = Uncertainty for 95% Confidence Level

[0092] Test Method: This test method is in accordance with American Society for Testing and Materials Standard Test Method for Laboratory Measurement of Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine—Designation: E 492-04/E 989-89. The uncertainty limits of each tapping machine location met the precision requirements of section 11.3 of ASTM E 492-04. The materials and test specimen are identical to that previously described. Results are indicated in Table V below and FIG. **5**.

TABLE V

Source room	Receiving room
Temperature [° C.]: 20.4	Volume V = 60.0 m^3
Humidity [%]: 59	Temperature [° C.]: 21.4
	Humidity [%]: 51

Impact Insulation Class IIC = 69 dB
Sum of unfavorable deviations: 30.0 dB
Max. unfavorable deviation: 8.0 dB at 100 Hz

Frequency [Hz]	L_n [dB]	L2 [dB]	T [s]	Corr. [dB]	u. Dev. [dB]	ΔL_n
100	51	54.0	2.06	−3.0	8	0.202
125	46	50.6	2.54	−4.6	3	0.173
160	47	52.1	3.27	−5.1	4	0.137
200	45	50.4	3.27	−5.4	2	0.108
250	44	48.9	3.32	−4.9	1	0.087
315	42	46.9	3.14	−49	-.-	0.096
400	42	46.8	3.09	−4.8	-.-	0.076
500	38	43.0	2.87	−5.0	-.-	0.067
630	39	43.2	2.67	−4.2	-.-	0.058
800	35	39.4	2.72	−4.4	-.-	0.070
1000	34	38.1	2.56	−4.1	-.-	0.042
1250	34	37.4	2.31	−3.4	-.-	0.044
1600	32	36.0	2.22	−4.0	-.-	0.042
2000	32	34.9	1.91	−2.9	3	0.033
2500	30	32.3	1.76	−2.3	4	0.036
3150	28	30.8	1.66	−2.8	5	0.037
4000	28	29.6	1.49	−1.6	-.-	0.035
5000	25	26.4	1.33	−1.4	-.-	0.041

L_n = Normalized Sound Pressure Level, dB
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
ΔL_n = Uncertainty for 95% Confidence Level

[0093] Identical tests were conducted with urethane adhesive in accordance with the present disclosure and similar results were achieved as evidenced by Table VI and FIG. **6**.

TABLE VI

Source room	Receiving room
Temperature [° C.]: 2.22	Volume V = 60.0 m^3
Humidity [%]: 47	Temperature [° C.]: 22.2
	Humidity [%]: 49

Impact Insulation Class IIC = 69 dB
Sum of unfavorable deviations: 30.0 dB
Max. unfavorable deviation: 8.0 dB at 100 Hz

Frequency [Hz]	L_n [dB]	L2 [dB]	T [s]	Corr. [dB]	u. Dev. [dB]	ΔL_n
100	51	54.0	2.06	−3.0	8	0.202
125	46	50.1	2.54	−4.1	3	0.173
160	47	52.7	3.27	−5.7	4	0.137
200	45	50.6	3.27	−5.6	2	0.108
250	44	49.6	3.32	−5.6	1	0.087
315	41	46.3	3.14	−5.3	-.-	0.096
400	43	47.7	3.09	−4.7	1	0.076
500	39	43.5	2.87	−4.5	-.-	0.067
630	36	40.5	2.67	−4.5	-.-	0.058
800	34	38.9	2.72	−4.9	-.-	0.070
1000	33	37.2	2.56	−4.2	-.-	0.042
1250	32	36.2	2.31	−4.2	-.-	0.044
1600	30	33.6	2.22	−3.6	-.-	0.042
2000	30	33.1	1.91	−3.1	1	0.033
2500	30	32.6	1.76	−2.6	4	0.036
3150	29	30.9	1.66	−1.9	6	0.037
4000	27	28.6	1.49	−1.6	-.-	0.035
5000	23	24.7	1.33	−1.7	-.-	0.041

L_n = Normalized Sound Pressure Level, dB
L2 = Receiving Room Level, dB
T = Reverberation Time, seconds
ΔL_n = Uncertainty for 95% Confidence Level

[0094] In the interests of brevity and conciseness, any ranges of values set forth in this specification are to be construed as written description support for claims reciting any sub-ranges having endpoints which are whole number values within the specified range in question. By way of a hypothetical illustrative example, a disclosure in this specification of a range of 1-5 shall be considered to support claims to any of the following sub-ranges: 1-4; 1-3; 1-2; 2-5; 2-4; 2-3; 3-5; 3-4; and 4-5.

[0095] These and other modifications and variations to the present disclosure can be practiced by those of ordinary skill in the art, without departing from the spirit and scope of the

present disclosure, which is more particularly set forth in the appended claims. In addition, it should be understood that aspects of the various embodiments can be interchanged both in whole or in part. Furthermore, those of ordinary skill in the art will appreciate that the foregoing description is by way of example only, and is not intended to limit the disclosure so further described in such appended claims.

What is claimed:

1. A method for applying an adhesive and sealer composition comprising:

spreading a composition over a surface with a trowel, the composition comprising either a moisture-curing urethane composition or an acrylic composition, the moisture-curing urethane composition comprising petroleum distillate in an amount of from about 2 weight percent to about 12 weight percent and polymeric isocyanate in an amount of from about 0.1 weight percent to about 3 weight percent, the acrylic composition comprising acrylic polymer in an amount of from about 8 weight percent to about 42 weight percent and an alkanolamine in an amount of from about 0.05 weight percent to about 0.5 weight percent, the trowel comprising a blade having an application edge defining a plurality of generally rectangular teeth, at least one of the teeth including an integrally connected projection extending from the bottom edge of the at least one tooth, the trowel blade configured to spread the composition across the surface with the projection causing a portion of the surface to not receive the composition;

applying wood flooring material onto the composition, the composition configured to form an adhesive bond between the surface and the wood flooring material with application of the wood floor causing the composition to spread across the portion of the surface that did not receive the composition.

2. The method of claim **1**, wherein the moisture-curing urethane composition or the acrylic composition has a viscosity of from about 130,000 cps to about 160,000 cps.

3. The method of claim **1**, wherein the moisture-curing urethane composition or the acrylic composition has a viscosity of from about 140,000 cps to about 155,000 cps.

4. The method of claim **1**, wherein the moisture-curing urethane composition comprises petroleum distillate in an amount of from about 5 weight percent to about 10 weight percent.

5. The method of claim **1**, wherein the acrylic composition comprises alkanolamine in an amount of from about 0.1 weight percent to about 0.4 weight percent.

6. The method of claim **1**, wherein the moisture-curing urethane composition or the acrylic composition is configured to prevent moisture from the surface from contacting the wood flooring material.

7. The method of claim **1**, wherein the moisture-curing urethane composition or the acrylic composition is configured to act as a crack suppressant for the surface.

8. The method of claim **1**, wherein the moisture-curing urethane composition or the acrylic composition further comprises an anti-microbial component.

9. A method for applying an adhesive and sealer composition comprising:

spreading a composition over a surface with a trowel, the composition comprising a moisture-curing urethane composition, the moisture-curing urethane composition comprising petroleum distillate in an amount of from about 2 weight percent to about 12 weight percent and polymeric isocyanate in an amount of from about 0.1 weight percent to about 3 weight percent, the trowel comprising a blade having an application edge defining a plurality of generally rectangular teeth, at least one of the teeth including an integrally connected projection extending from the bottom edge of the at least one tooth, the trowel blade configured to spread the composition across the surface with the projection causing a portion of the surface to not receive the composition;

applying wood flooring material onto the composition, the composition configured to form an adhesive bond between the surface and the wood flooring material with application of the wood floor causing the composition to spread across the portion of the surface that did not receive the composition.

10. A method for applying an adhesive and sealer composition comprising:

spreading a composition over a surface with a trowel, the composition comprising an acrylic composition, the acrylic composition comprising acrylic polymer in an amount of from about 8 weight percent to about 42 weight percent and an alkanolamine in an amount of from about 0.05 weight percent to about 0.5 weight percent, the trowel comprising a blade having an application edge defining a plurality of generally rectangular teeth, at least one of the teeth including an integrally connected projection extending from the bottom edge of the at least one tooth, the trowel blade configured to spread the composition across the surface with the projection causing a portion of the surface to not receive the composition;

applying wood flooring material onto the composition, the composition configured to form an adhesive bond between the surface and the wood flooring material with application of the wood floor causing the composition to spread across the portion of the surface that did not receive the composition.

11. A kit for applying an adhesive and sealer composition comprising:

a moisture-curing urethane composition comprising petroleum distillate in an amount of from about 2 weight percent to about 12 weight percent and polymeric isocyanate in an amount of from about 0.1 weight percent to about 3 weight percent; and

a trowel blade, the blade having an application edge defining a plurality of generally rectangular teeth, at least one of the teeth including an integrally connected projection extending from the bottom edge of the at least one tooth, the trowel blade configured to spread the composition across a surface with the projection causing a portion of the surface to not receive the composition, the composition configured to form an adhesive bond between the surface and wood flooring material with application of the wood flooring material causing the composition to spread across the portion of the surface that did not receive the composition.

12. The kit of claim **11**, wherein the moisture-curing urethane composition has a viscosity of from about 130,000 cps to about 160,000 cps.

13. The kit of claim **11**, wherein the moisture-curing urethane composition has a viscosity of from about 140,000 cps to about 155,000 cps.

14. The kit of claim **11**, wherein the moisture-curing urethane composition comprises petroleum distillate in an amount of from about 5 weight percent to about 10 weight percent.

15. The kit of claim **11**, wherein the moisture-curing urethane composition is configured to prevent moisture from the surface from contacting the wood flooring material.

16. A kit for applying an adhesive and sealer composition comprising:

an acrylic composition comprising acrylic polymer in an amount of from about 8 weight percent to about 42 weight percent and an alkanolamine in an amount of from about 0.05 weight percent to about 0.5 weight percent; and

a trowel blade, the blade having an application edge defining a plurality of generally rectangular teeth, at least one of the teeth including an integrally connected projection extending from the bottom edge of the at least one tooth, the trowel blade configured to spread the composition across a surface with the projection causing a portion of the surface to not receive the composition, the composition configured to form an adhesive bond between the surface and wood flooring material with application of the wood flooring material causing the composition to spread across the portion of the surface that did not receive the composition.

17. The kit of claim **16**, wherein the acrylic composition has a viscosity of from about 130,000 cps to about 160,000 cps.

18. The kit of claim **16**, wherein the acrylic composition has a viscosity of from about 140,000 cps to about 155,000 cps.

19. The kit of claim **16**, wherein the acrylic composition comprises alkanolamine in an amount of from about 0.1 weight percent to about 0.4 weight percent.

20. The kit of claim **16**, wherein the acrylic composition is configured to prevent moisture from the surface from contacting the wood flooring material.

* * * * *