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(57) **Abrégé/Abstract:**

There is provided a two-part moisture cure organopolysiloxane composition comprising a base part and a catalyst package wherein the catalyst package, despite comprising amino silane(s), alkoxy silane(s), tin catalyst(s) and optionally reinforcing filler(s) and/or extending filler(s) in a carrier fluid, undergoes minimal phase separation during storage, by utilizing one or more polyaryloorganosiloxane polymers or silicone copolymers thereof as the carrier fluid, enabling the catalyst package to be stored and function as a shelf stable continuous phase.

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MOISTURE CURABLE COMPOSITIONS

There is provided a two-part moisture cure organopolysiloxane composition comprising a base part and a catalyst package wherein the catalyst package, despite comprising amino silane(s), alkoxy silane(s), tin catalyst(s) and optionally reinforcing filler(s) and/or extending filler(s) in a carrier fluid, undergoes minimal phase separation during storage, by utilizing one or more polyarylorganosiloxane polymers or silicone copolymers thereof as the carrier fluid, enabling the catalyst package to be stored and function as a shelf stable continuous phase.

Condensation curable organosiloxane compositions, which cure to elastomeric solids, are well known. Typically, such compositions are obtained by mixing a polydiorganosiloxane having two or more hydroxy groups and/or hydrolysable groups per molecule, with e.g., a silane cross-linking agent which is reactive with the polydiorganosiloxane, for example an acetoxy silane, an oximosilane, an aminosilane or an alkoxy silane in the presence of a suitable catalyst. Such condensation curable organopolysiloxane compositions are generally provided in either one-part or multiple-part, e.g., two-part compositions.

Conventional one-part compositions are usually cured utilizing titanate or zirconate type catalysts via a skin or diffusion cure mechanism by initially forming a cured skin at the composition/air interface subsequent to the sealant/encapsulant being applied on to a substrate surface. This is then followed by a gradual thickening of the cured skin over time from the cured skin into the bulk of the composition with the cure speed dependent on the speed of diffusion of moisture from the sealant/encapsulant interface with air to the inside (or bulk) of the composition, and the diffusion of condensation reaction by-product/effluent from the bulk of the composition out through the cured skin. These formulations are typically applied onto a substrate or the like in a layer that is thinner than 15 mm.

In contrast, conventional two-part organopolysiloxane compositions comprise:

a first part (base) that contains silanol-terminated diorganopolysiloxane and a reinforcing filler e.g., precipitated calcium carbonate; and

a second part (catalyst or cure package) containing an alkyl-terminated diorganopolysiloxane, tin based catalyst, cross-linker and aminosilane, e.g., a primary aminosilane.

The properties of individual parts of said multi-part compositions are generally not affected by atmospheric moisture. Once mixed together the resulting mixture possesses excellent deep curability and enables substantially uniform curing throughout the entire body of the sealing material. This is because curing proceeds via a bulk cure mechanism wherein the composition will cure simultaneously throughout the material bulk thereby providing a sealant and adhesive materials able to cure in comparatively thicker layers than the above one-part compositions to provide an elastomeric body of greater than 15 mm in depth. It is generally acknowledged that the cure speed of

two-part moisture cure organopolysiloxane compositions, such as silicone adhesive/sealant compositions, as described above provide excellent deep curability and substantially uniform curing throughout the entire body of the sealing material, much quicker than one-part sealant compositions. However, problems exist.

5 It is frequently desirable that the two-part moisture cure organopolysiloxane compositions cure quickly enough to provide a sound seal within several hours but not so quickly that the surface cannot be tooled to a desired configuration shortly after application onto a target substrate surface. That said, in many applications, such as insulating glass, it is important for a two-part sealant to build bulk mechanical properties (such as elastic modulus or hardness as measured by durometer
10 measurements) quickly so that substrates to which they have been applied can be moved soon after assembly, reducing work in progress (WIP). This can be achieved by increasing cure speed by adjusting tin-based catalyst and/or aminosilane levels (when e.g., functioning as an adhesion promoter). However, increasing the speed of cure comes with the drawback that it reduces the period of time during which the composition can be tooled into a desired shape/position before cure
15 and reduces the tack-free time. Furthermore, relying on fast-curing two-part moisture cure organopolysiloxane compositions can reduce static mixer life and negatively impact productivity for the end user as changing static mixers results in down time and increased base purges wastes material.

Furthermore, in two-part formulations the base part comprising the organopolysiloxane polymer and
20 filler is typically present in a significantly bigger proportion than the catalyst part, i.e., whilst the weight : weight ratio or volume : volume ratio of base: catalyst package can be 1 : 1, it is more often than not much greater than e.g., 10 : 1 or even higher. When the ratio is e.g., 10 : 1 the catalyst package needs to contain high concentrations of active ingredients such as catalysts, cross-linkers and aminosilanes in order to deliver adequate functionality for curing and adhesion. High
25 concentrations of primary amine and tin catalyst in the catalyst package that can induce random chain scission of trimethylsiloxy-terminated polydimethylsiloxane carrier fluid, thus reducing the continuous phase viscosity and increasing the velocity of particle settling.

Another issue which can be even more significant is that catalyst packages of the type described above may have miscibility issues, especially during storage for extended periods of time. This
30 tends to cause the standard trimethylsilyl-terminated polydimethylsiloxane carrier liquid such as polydimethylsiloxane to phase separate by forming an upper layer while the filler settles to the bottom of the mixture in a silane rich lower phase. The resulting non-uniform distribution of important curing additives within the catalyst package on storage can lead to poorly performing and even non-curing sealants when mixed with the base. In these cases, the separated catalyst package
35 requires re-mixing at to avoid the alternative to replacing the entire catalyst package.

As a result of the above phase separation, the storage stability of the catalyst package may be dramatically impacted. Phase separation is a significant issue for end users. It is extremely messy and time consuming to remix the catalyst package of such two-part moisture cure organopolysiloxane compositions before use, after a storage period, especially on a large scale as some of the catalysts used can be flammable thereby causing a potential safety hazard.

It has been previously identified in WO2019027897 that one way of successfully avoiding phase separation in a catalyst package during storage is by using dipodal silanes which are compatible with a polydialkylsiloxane having the general formula:



where R^2 is an alkyl or phenyl group, each R^3 group may be the same or different and are selected from R^2 alkyl, phenyl, alkenyl or alkynyl groups having a viscosity of from about 5 to about 100,000 mPa.s at 25 °C, i.e., d is an integer which provides this viscosity range. Such a combination appeared to solve the problem of phase separation, but it was found that such compositions proved to be very slow with respect to the development (build) of adhesion.

Hence, there is a need to provide a two-part moisture cure organopolysiloxane compositions such as cure adhesives/sealant compositions in which a catalyst package is provided which overcomes these long-known issues.

There is provided herein a two-part moisture curing silicone composition having a base part and catalyst package part in which, the catalyst package comprises:

(i) a carrier fluid comprising one or more polyaryloorganosiloxane polymers which comprise a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons; or

one or more silicone copolymers comprising a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons; or a mixture thereof;

(ii) a cross-linker of the structure $\text{R}^7\text{-Si-R}^6_{4-c}$ wherein each R^7 is an alkoxy group having from 1 to 10 carbons, a ketoximino group or an alkenyloxy group; each R^6 is selected from is a non-hydrolysable silicon-bonded organic group, and c is 2, 3 or 4.

(iii) an aminosilane;

(iv) a tin-based catalyst and optionally

(v) a reinforcing filler, a non-reinforcing filler or a mixture of reinforcing filler and non-reinforcing filler.

In the two-part moisture curing silicone composition described above, the base part may comprise:

- (a) A siloxane polymer having at least two terminal hydroxyl or hydrolysable groups having a viscosity of from 1000 to 200,000, alternatively 2000 to 150,000 mPa.s at 25 °C;
- (b) One or more reinforcing fillers; and optionally
- (c) One or more non-reinforcing fillers.

5 There is also provided herein the use of one or more polyarylorganosiloxane polymers which comprise a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons; or

10 one or more silicone copolymers comprising a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons;

or a mixture thereof

as a carrier fluid (i) in a catalyst package otherwise comprising;

15 (ii) a cross-linker of the structure $\text{R}^7_c - \text{Si} - \text{R}^6_{4-c}$ wherein each R^7 is an alkoxy group having from 1 to 10 carbons, a ketoximino group or an alkenyloxy group; each R^6 is selected from is a non-hydrolysable silicon-bonded organic group, and c is 2, 3 or 4.

(iii) an aminosilane;

(iv) a tin-based catalyst and optionally

20 (v) a reinforcing filler, a non-reinforcing filler or a mixture of reinforcing filler and non-reinforcing filler;

for a two-part moisture curing silicone composition having a base part and the aforementioned catalyst package part.

The catalyst package of the two-part moisture cure organopolysiloxane composition described above utilizes an alternative carrier fluid from the industry standard trimethylsiloxy-terminated

25 polydimethylsiloxane, namely one or more polyarylorganosiloxane polymers or silicone copolymers thereof identified above as carrier fluid (i). It was surprisingly found that using this new carrier fluid results in the catalyst package exhibited markedly less phase separation than catalyst packages using said trimethylsiloxy-terminated polydimethylsiloxane.

It was found that, when using carrier fluid (i) together with the other ingredients (ii) to (iv) and

30 optionally (v) of the catalyst package, a fully compatible, shelf stable continuous phase was generated. In particular it was found that the carrier fluid (i) and aminosilanes (iii) were miscible after mixing and did not separate over time. Hence, using carrier fluid (i) in the catalyst package enabled the use of aminosilanes as described herein in the catalyst package without phase separation which is often seen after storage when the carrier fluid is the industry standard trimethylsiloxy-

35 terminated polydimethylsiloxane. Furthermore, it would appear that the use of one or more polyarylorganosiloxane polymers and/or silicone copolymers thereof as carrier fluid (i) as described

herein provides the desired combination of storage stability in the catalyst package without sacrificing adhesion, cure rate or other critical performance properties in the cured product, in particular when the catalyst package and base composition are mixed together. In comparison when industry standard trimethylsiloxy-terminated polydimethylsiloxanes are utilized as the carrier fluid
5 in a catalyst package, increasing the amount of aminosilane present tends to cause random chain scission of the trimethylsiloxy-terminated polydimethylsiloxane leading to a significant viscosity decrease of the catalyst package and an acceleration in the settling of the fillers out of the continuous phase.

Also, the aminosilanes and trimethylsiloxy-terminated polydimethylsiloxanes are not very
10 compatible and as such when increasing amounts of aminosilanes are introduced into the catalyst package formulation, there is an increasing tendency for phase separation to occur. As a result of the above phenomena, the storage stability of the catalyst package material will be dramatically impacted.

The disclosure herein includes the use of polyarylorganosiloxane polymers and silicone copolymers
15 to improve the package stability of the curing agent. This is in contrast to the art where it is known that high loadings of polyarylorganosiloxane polymers can impact bulk properties such as refractive index and gas permeability coefficients of the cured elastomer. In contrast, this disclosure does not significantly alter the bulk properties such as refractive index and gas permeability of the silicone products such as sealants resulting from two-part moisture cure organopolysiloxane compositions
20 described herein because the base part, which typically represents the majority of the sealant formulation, is kept as a standard organopolysiloxane polymer to retain the suitable bulk properties of silicone elastomers in sealant applications. Our catalyst package contains substantially trimethylsilyl terminated polydimethylsiloxane, i.e., a maximum of 5 wt. % of the catalyst package is trimethylsilyl terminated polydimethylsiloxane, alternatively less than 2.5 wt. % of the catalyst
25 package is trimethylsilyl terminated polydimethylsiloxane, alternatively the catalyst package is free from trimethylsilyl terminated polydimethylsiloxane.

In the disclosure herein replacing industry standard trimethylsiloxy-terminated polydimethylsiloxanes with carrier fluid (i) has no negative effect on adhesion of the two-part moisture cure organopolysiloxane composition once mixed together and applied onto a substrate
30 surface. Once cured the sealant as described herein retains cohesive failure to a variety of substrates, including glass and many glass coatings such as Low-E type coatings. Low-E coated glass is glass that has a colorless, ultra-thin reflective coating on the glass which limits the level of UV light able to pass through the glass. Such coatings can be difficult for silicone sealants to adhere to.

35 **Catalyst Package**

In the catalyst package described herein there are the following ingredients:

- (i) a carrier fluid comprising one or more polyarylorganosiloxane polymers which polymer or copolymer comprises a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons or
- 5 one or more silicone copolymers comprising a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons;
- or a mixture thereof;
- (ii) a cross-linker of the structure $\text{R}^7_c - \text{Si} - \text{R}^6_{4-c}$ wherein each R^7 is an alkoxy group having from 1 to
- 10 10 carbons, a ketoximino group or an alkenyloxy group; each R^6 is selected from is a non-hydrolysable silicon-bonded organic group, and c is 2, 3 or 4.
- (iii) an aminosilane;
- (iv) a tin-based catalyst and optionally
- (v) a reinforcing filler, a non-reinforcing filler or a mixture of reinforcing filler and non-reinforcing
- 15 filler

Carrier Fluid (i)

- Carrier fluid (i) comprises one or more polyarylorganosiloxane polymers which comprise a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18
- 20 carbons; or
- one or more silicone copolymers comprising a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons;
- or a mixture thereof;
- 25 R^4 may be any suitable monovalent substituent comprising an aromatic group having from 6 to 18 carbons for example phenyl, tolyl, xylyl, naphthyl, groups bound directly to silicon; substituted phenyl, substituted tolyl, substituted xylyl, substituted naphthyl, groups bound directly to silicon (i.e. where an aromatic group is bound directly to silicon) or an alkaryl group or substituted alkaryl group (i.e. where the aryl group is bound indirectly to silicon by way of an alkyl chain) such as a
- 30 benzyl group or substituted benzyl group.
- For the purpose of this application “Substituted” means one or more hydrogen atoms in a hydrocarbon group has been replaced with another substituent. Examples of such substituents include, but are not limited to, aliphatic organic groups, halogen atoms such as chlorine, fluorine, bromine, and iodine; halogen atom containing groups such as chloromethyl, perfluorobutyl,
- 35 trifluoroethyl, and nonafluorohexyl; oxygen atoms; oxygen atom containing groups such as (meth)acrylic and carboxyl; nitrogen atoms; nitrogen atom containing groups such as amino-

functional groups, amido-functional groups, and cyano-functional groups; sulphur atoms; and sulphur atom containing groups such as mercapto groups.

Specific examples of R^4 include but are not limited to phenyl, tolyl, xylyl, naphthyl, benzyl, ethyl-phenyl, 2-phenylalkyl groups such as 2-phenylethyl; 2-phenylpropyl groups and equivalent

5 substituted groups. Alternatively, R^4 is a phenyl group or substituted phenyl group.

Each R^5 may be the same or different and may comprise R^4 or an alternative monovalent organic group having from 1 to 18 carbons such as an alkyl group having from 1 to 18 carbon atoms, alternatively an alkyl group having 1 to 12 carbon atoms, alternatively an alkyl group having 1 to 6 carbon atoms, alternatively a methyl or an ethyl group, alternatively a methyl group; a substituted

10 hydrocarbyl group having from 1 to 18 carbon atoms; a hydrocarbonoxy group having from 1 to 18 carbon atoms alternatively an alkoxy group having from 1 to 12 carbon atoms, alternatively an alkoxy group having from 1 to 6 carbon atoms, alternatively a methoxy or ethoxy group,

alternatively a methoxy group, alternatively an alkenyl group having from 1 to 12 carbon atoms, alternatively an alkenyl group having from 1 to 6 carbon atoms, alternatively Suitable unsaturated

15 groups include alkenyl groups having from 2 to 10 carbon atoms e.g. vinyl ($H_2C=CH-$) propenyl ($H_2C=CHCH_2-$), allyl ($CH_2=CHCH_2-$) as well as by the following structures; $H_2C=C(CH_3)CH_2-$, $H_2C=CHCH_2CH_2-$, $H_2C=CHCH_2CH_2CH_2-$, and hexenyl ($H_2C=CHCH_2CH_2CH_2CH_2-$); alternatively a vinyl or hexenyl group, alternatively a vinyl group. In one embodiment R^5 may not be R^4 and as such R^5 does not therefore contain any aromatic groups. In one embodiment each R^5 is an alkyl

20 group having 1 to 6 carbon atoms, alternatively a methyl or an ethyl group, alternatively a methyl group.

Each polyarylorganosiloxane polymer or silicone copolymer may be linear, branched or cyclic. Siloxy units may be described by a shorthand (abbreviated) nomenclature, namely - "M," "D," "T," and "Q", when R is a methyl group The M unit corresponds to a siloxy unit where $a = 3$, that is $R_3SiO_{1/2}$; the D unit corresponds to a siloxy unit where $a = 2$, namely $R_2SiO_{2/2}$; the T unit corresponds to a siloxy unit where $a = 1$, namely $R_1SiO_{3/2}$; the Q unit corresponds to a siloxy unit where $a = 0$, namely $SiO_{4/2}$. The polyarylorganosiloxane polymer or silicone copolymer of carrier fluid (i) is substantially linear but may contain some T units and/or some Q units to provide branching.

When linear or branched said each polyarylorganosiloxane polymer or silicone copolymer may be 30 trialkyl silyl terminated, dialkylalkoxysilyl terminated, dialkylalkenyl silyl terminated, triphenylsilyl terminated, diphenyl alkyl silyl terminated or dialkylphenyl silyl terminated with said alkyl, alkoxy and/or alkenyl groups are as defined above.

Each polyarylorganosiloxane copolymer may be a siloxane copolymer which comprises both, a plurality of repeating $-[Si(R^4)(R^5) - O]-$ units as described above and a plurality of repeating

35 $-[Si(R^{10})_2 - O]-$ units wherein each R^{10} may be the same or different and may be a monovalent organic group having from 1 to 18 carbons selected from an alkyl group having from 1 to 18 carbon atoms,

alternatively an alkyl group having 1 to 12 carbon atoms, alternatively an alkyl group having 1 to 6 carbon atoms, alternatively a methyl or an ethyl group, alternatively a methyl group; a substituted hydrocarbyl group having from 1 to 18 carbon atoms; a hydrocarboxy group having from 1 to 18 carbon atoms alternatively an alkoxy group having from 1 to 12 carbon atoms, alternatively an alkoxy group having from 1 to 6 carbon atoms, alternatively a methoxy or ethoxy group, alternatively a methoxy group, alternatively an alkenyl group having from 1 to 12 carbon atoms, alternatively an alkenyl group having from 1 to 6 carbon atoms, alternatively alkenyl groups having from 2 to 10 carbon atoms e.g. vinyl ($\text{H}_2\text{C}=\text{CH}-$) propenyl ($\text{H}_2\text{C}=\text{CHCH}_2-$), allyl ($\text{CH}_2=\text{CHCH}_2-$) as well as by the following structures; $\text{H}_2\text{C}=\text{C}(\text{CH}_3)\text{CH}_2-$, $\text{H}_2\text{C}=\text{CHCH}_2\text{CH}_2-$, $\text{H}_2\text{C}=\text{CHCH}_2\text{CH}_2\text{CH}_2-$, and hexenyl ($\text{H}_2\text{C}=\text{CHCH}_2\text{CH}_2\text{CH}_2\text{CH}_2-$); alternatively a vinyl or hexenyl group, alternatively a vinyl group. In one embodiment each R^{10} is the same or different and is an alkyl group having 1 to 6 carbon atoms, alternatively a methyl or an ethyl group, alternatively a methyl group.

When said carrier fluid (i) is one or more silicone copolymers as described above, such silicone copolymers may be random copolymers or block copolymers e.g. those commonly referred to as ABA and $(\text{AB})_n$ type block copolymers where the plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5)-\text{O}-$ units as described above may be either A type blocks or B type blocks and the plurality of repeating $-\text{Si}(\text{R}^{10})_2-\text{O}-$ units are the other of block A or B and n is the number of repeating AB blocks in the silicone copolymer. In one alternative when the carrier fluid (i) comprises one or more silicone copolymers

As described above each copolymer comprises from about 20 wt.% to 80 wt.% of repeating $-\text{Si}(\text{R}^4)(\text{R}^5)-\text{O}-$ units with the remainder of repeating units in the copolymer backbone being, in each instance repeating $-\text{Si}(\text{R}^{10})_2-\text{O}-$ units. For the avoidance of doubt the silicone copolymer does not contain organic repeating units along the backbone of said copolymers.

The viscosity of carrier fluid (i) may be from about 250 mPa.s at 25 °C to 100,000 mPa.s at 25 °C, alternatively from 1500 mPa.s at 25 °C to 80,000 mPa.s at 25 °C, alternatively from 2500 mPa.s at 25 °C to 75,000 mPa.s at 25 °C, alternatively from 2500 mPa.s at 25 °C to 70,000 mPa.s at 25 °C.

Unless otherwise indicated all viscosity measurement given are zero-shear viscosity (η_0) values, obtained by extrapolating to zero the value taken at low shear rates (or simply taking an average of values) in the limit where the viscosity-shear rate curve is rate-independent, which is a test-method independent value provided a suitable, properly operating rheometer is used. For example, the zero-shear viscosity of a substance at 25 °C may be obtained by using commercial rheometers such as an Anton-Parr MCR-301 rheometer or a TA Instruments AR-2000 rheometer equipped with cone-and-plate fixtures of suitable diameter to generate adequate torque signal at a series of low shear rates, such as 0.01 s^{-1} , 0.1 s^{-1} and 1.0 s^{-1} while not exceeding the torque limits of the transducer.

Alternatively, the viscosity measurements may be obtained using an ARES-G2 rotational rheometer, commercially available from TA Instruments using a steady rate sweep from 0.1 to 10 s^{-1} on a 25 mm cone and plate. If the zero-shear plateau region cannot be observed at shear rates

accessible to the rheometer or viscometer, we report the viscosity measured at a standard shear rate of 0.1 s^{-1} at $25 \text{ }^\circ\text{C}$.

The number average degree of polymerization of the polyarylorganosiloxane polymers or silicone copolymers of carrier fluid (i) can be determined by dividing the number average molecular weight (Mn) thereof by the formula weight of the repeating units.

The number average molecular weight (Mn) of each polyarylorganosiloxane polymer or silicone copolymer of carrier fluid (i) may range from about 200 to 750,000 g/mol, alternatively from about 300 to 500,000 g/mol, alternatively from about 1000 to 250,000 g/mol, alternatively from about 2500 to 100,000 g/mol, alternatively from about 5,000 to around 60,000 g/mol. determined by gel permeation chromatography using polystyrene standards.

In one embodiment the carrier fluid (i) is a phenylorganosiloxane polymer, alternatively a phenylalkylsiloxane polymer, alternatively a diphenylsiloxane polymer, such as an optionally substituted phenylmethylsiloxane polymer, an optionally substituted diphenylsiloxane polymer, or is a dimethyl and phenylmethyl siloxane copolymer, or is a dimethyl and diphenyl siloxane copolymer wherein said phenyl groups may contain optional substitution. In other embodiments, the carrier fluid (i) is an alkarylsiloxane polymer in which the aromatic group is attached to the silicon atoms in the polymer backbone through hydrocarbon or substituted hydrocarbon bridging group, such as a dimethyl and methyl(2-phenylpropyl)siloxane copolymer. Such polymers can be obtained by a variety of methods known in the art, including by hydrosilylation of ethylenically unsaturated aromatic compounds such as α -methylstyrene with silicon hydride functional organopolysiloxanes. In other embodiments, the alkarylsiloxane polymers can be obtained by radical grafting methods to graft benzyl, tolyl or xylyl substituents onto organopolysiloxanes.

Typically, the carrier fluid (i), is present in the catalyst package in an amount of from 30 to 80 weight % (wt. %), alternatively 40 to 65 wt. % of the total weight of the catalyst package.

25 **Cross-Linker (ii)**

Cross-linker (ii) utilized herein has the structure $\text{R}^7_c\text{-Si-R}^6_{4-c}$ wherein each R^7 is an alkoxy group having from 1 to 10 carbons, each R^6 is selected from is a non-hydrolysable silicon-bonded organic group, and c is 2, 3 or 4. Each R^7 may be a ketoximino group (for example dimethyl ketoximo, and isobutylketoximino); an alkoxy group (for example methoxy, ethoxy, iso-butoxy and propoxy) or an alkenyloxy groups (for example isopropenyloxy and 1-ethyl-2-methylvinylxy). For example, R^7 may be the sake of example methoxy, ethoxy, propoxy iso-propoxy, butoxy, t-butoxy, pentoxy (amyloxy), isopentoxy (isoamyloxy), hexoxy and isohexoxy.

In one embodiment all R^7 groups present are the same. Each R^6 group may be any suitable non-hydrolysable silicon-bonded organic group, such as an alkyl group having from 1 to 6 carbons (for example methyl, ethyl, propyl, and butyl); an alkenyl group having from 2 to 6 carbons, (for example vinyl and allyl) cycloalkyl groups (for example cyclopentyl and cyclohexyl); aryl groups

(for example phenyl, and tolyl); aralkyl groups (for example 2-phenylethyl). It will be seen that subscript c maybe 2, 3 or 4. Typically, crosslinker (ii) may only function as a cross-linker when subscript c is 2 if, the polymer present in the base part composition comprises more than two -OH or hydrolysable groups per molecule otherwise it will solely cause chain-extension and not functioning
5 as a cross-linker. Preferably subscript c is either 3 or 4 for cross-linking purposes but it is to be understood that in some cases, it is desirable to include a fraction of di(alkoxy)functional silanes (c=2) in a mixture with tri or tetrafunctional alkoxy silanes (c=3 or 4) to impart chain-extension and flexibility.

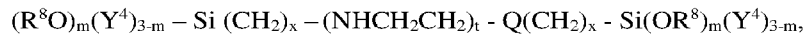
Silanes which can be used as cross-linkers (ii) include bis (trimethoxysilyl)hexane, 1,2-bis
10 (triethoxysilyl)ethane, alkyltrialkoxysilanes such as methyltrimethoxysilane (MTM) and methyltriethoxysilane, alkenyltrialkoxo silanes such as vinyltrimethoxysilane and vinyltriethoxysilane, isobutyltrimethoxysilane (iBTM). Other suitable silanes include ethyltrimethoxysilane, phenyltrimethoxysilane, 3,3,3-trifluoropropyltrimethoxysilane, cyanoethyltrimethoxysilane, tetramethoxysilane, tetraethoxysilane (tetraethyl orthosilicate),
15 tetrapropoxysilane (tetrapropyl orthosilicate) and tetrapentoxysilane (tetraamyl orthosilicate); or alternatively alkoxytrioximosilane, alkenyltrioximosilane, methyltris(methylethylketoximo)silane, vinyl-tris-methylethylketoximo)silane, methyltris(methylethylketoximino)silane, alkenyl alkyl dialkoxysilanes such as vinyl methyl dimethoxysilane, vinyl ethyldimethoxysilane, vinyl methyl diethoxysilane, vinyl ethyldiethoxysilane, alkenylalkyldioximosilanes such as vinyl methyl
20 dioximosilane, vinyl ethyldioximosilane, vinyl methyl dioximosilane, vinyl ethyldioximosilane and/or methylphenyl-dimethoxysilane. The cross-linker (ii) used may also comprise any combination of two or more of the above. The catalyst package may comprise from 1 to 30 wt. % of cross-linker (ii), alternatively 5 to 25 wt. % of cross-linker (ii).

Aminosilanes (iii)

25 The aminosilanes incorporated in the catalyst package for the two-part moisture curing silicone compositions described herein may function as adhesion promoters. Examples of aminosilane (iii) which are incorporated in the catalyst package for the two-part moisture curing silicone compositions described herein include (N-phenylamino)methyltrimethoxysilane, aminomethyltrimethoxysilane, diethylaminomethyldiethoxysilane,
30 diethylaminomethyltriethoxysilane, (ethylenediaminepropyl)trimethoxy silane, aminoalkylalkoxysilanes, for example gamma-aminopropyltriethoxysilane or gamma-aminopropyltrimethoxysilane. Further suitable aminosilanes (iii) are reaction products of epoxyalkylalkoxysilanes, such as 3-glycidoxypropyltrimethoxysilane with amino-substituted alkoxy silanes such as 3-aminopropyltrimethoxysilane and optionally with alkylalkoxysilanes such
35 as methyltrimethoxysilane. Typically, the aminosilanes (iii) are present in a range of from 1 to 25 wt. % of the catalyst package, alternatively 2 to 20 wt. % of the catalyst package.

In one alternative, the catalyst package does not comprise

One or more dipodal silanes in accordance with the formula:



5 where R^8 is a C_{1-10} alkyl group, Y^4 is an alkyl groups containing from 1 to 8 carbons, Q is a chemical group containing a heteroatom with a lone pair of electrons; each x is an integer of from 1 to 6, t is 0 or 1 and each m is independently 1, 2 or 3.

Tin-based Catalyst (iv)

The fourth essential ingredient in the catalyst package is a suitable tin-based condensation catalyst (iv) which is for use as the catalyst for the cure reaction subsequent to mixing the base part and catalyst package part together. Examples include tin triflates, organic tin metal catalysts such as triethyltin tartrate, tin octoate, tin oleate, tin naphthenate, butyltintri-2-ethylhexoate, tinbutyrate, carbomethoxyphenyl tin trisuberate, isobutyltintriceroate, and diorganotin salts especially diorganotin dicarboxylate compounds such as dibutyltin dilaurate (DBTDL), dioctyltin dilaurate (DOTDL), dimethyltin dibutyrate, dibutyltin dimethoxide, dibutyltin diacetate (DBTDA), dibutyltin bis(2,4-pentanedionate), dibutyltin dibenzoate, stannous octoate, dimethyltin dineodecanoate (DMTDN), dioctyltin dineodecanoate (DOTDN) and dibutyltin dioctoate.

The tin catalyst may be present in an amount of from 0.01 to 3 wt. % of the catalyst package; alternatively, 0.05 to 1.5 wt. % of the catalyst package, alternatively, 0.05 to 0.75 wt. % of the catalyst package.

20 **Fillers (v)**

The reinforcing filler (v) when present may contain one or more reinforcing fillers such as calcium carbonate, high surface area fumed silica and/or precipitated silica including, for example, rice hull ash. Reinforcing filler (v) may contain one or more finely divided, reinforcing fillers such as precipitated calcium carbonate, ground calcium carbonate, fumed silica, colloidal silica and/or precipitated silica.

Typically, the surface area of the reinforcing filler (v) is at least 15 m²/g in the case of precipitated calcium carbonate measured in accordance with the BET method in accordance with ISO 9277: 2010, alternatively 15 to 50 m²/g, alternatively, 15 to 25 m²/g in the case of precipitated calcium carbonate. Silica reinforcing fillers have a typical surface area of at least 50 m²/g. In one embodiment reinforcing filler (v) is a precipitated calcium carbonate, precipitated silica and/or fumed silica; alternatively, precipitated calcium carbonate. In the case of high surface area fumed silica and/or high surface area precipitated silica, these may have surface areas of from 75 to 400 m²/g measured using the BET method in accordance with ISO 9277: 2010, alternatively of from 100 to 300 m²/g using the BET method in accordance with ISO 9277: 2010.

35

The optional non-reinforcing filler may comprise non-reinforcing fillers such as crushed quartz, diatomaceous earths, barium sulphate, iron oxide, titanium dioxide and carbon black, talc, wollastonite. Other fillers which might be used alone or in addition to the above include aluminite, calcium sulphate (anhydrite), gypsum, calcium sulphate, magnesium carbonate, clays such as kaolin, aluminium trihydroxide, magnesium hydroxide (brucite), graphite, copper carbonate, e.g., malachite, nickel carbonate, e.g., zarachite, barium carbonate, e.g., witherite and/or strontium carbonate e.g., strontianite.

Aluminium oxide, silicates from the group consisting of olivine group; garnet group; aluminosilicates; ring silicates; chain silicates; and sheet silicates. The olivine group comprises silicate minerals, such as but not limited to, forsterite and Mg_2SiO_4 . The garnet group comprises ground silicate minerals, such as but not limited to, pyrope; $Mg_3Al_2Si_3O_{12}$; grossular; and $Ca_2Al_2Si_3O_{12}$. Aluminosilicates comprise ground silicate minerals, such as but not limited to, sillimanite; Al_2SiO_5 ; mullite; $3Al_2O_3 \cdot 2SiO_2$; kyanite; and Al_2SiO_5 .

The ring silicates group comprises silicate minerals, such as but not limited to, cordierite and $Al_3(Mg,Fe)_2[Si_4AlO_{18}]$. The chain silicates group comprises ground silicate minerals, such as but not limited to, wollastonite and $Ca[SiO_3]$.

The sheet silicates group comprises silicate minerals, such as but not limited to, mica; $K_2Al_{14}[Si_6Al_2O_{20}](OH)_4$; pyrophyllite; $Al_4[Si_8O_{20}](OH)_4$; talc; $Mg_6[Si_8O_{20}](OH)_4$; serpentine for example, asbestos; Kaolinite; $Al_4[Si_4O_{10}](OH)_8$; and vermiculite. The optional non-reinforcing filler, when present, is present in an amount up to 20 wt.% of the base.

Filler (v) may be hydrophobically treated for example with one or more aliphatic acids, e.g., a fatty acid such as stearic acid or a fatty acid ester such as a stearate, or with organosilanes, organosiloxanes, or organosilazanes hexaalkyl disilazane or short chain siloxane diols to render the filler(s) (v) hydrophobic and therefore easier to handle and obtain a homogeneous mixture with the other adhesive components. These surface modified fillers do not clump. The fillers may be pre-treated or may be treated in situ.

Fillers (v) may be present in the catalyst package in an amount of from 0 to 50 wt. % depending on the mixing ratio of the two-parts of the two-part moisture cure organopolysiloxane composition.

Additives

The catalyst package may also include one or more additives if desired. These may include additional non-amino adhesion promoters, adhesion catalysts, pigments and/or colorants, rheology modifiers, flame retardants, stabilizers such as antioxidants, UV and/or light stabilizers and fungicides and/or biocides and the like. It will be appreciated that some of the additives are included in more than one list of additives. Such additives would then have the ability to function in all the different ways referred to. For example, pigments and/or coloured (non-white) fillers e.g.,

carbon black may be utilized in the catalyst package to colour the end sealant product. When present carbon black will function as both a non-reinforcing filler and pigment/colorant.

Non-amino adhesion promoters

One or more non-amino adhesion promoters may be utilized in the composition herein. These may
5 include, for the same of example, epoxyalkylalkoxysilanes, for example, 3-glycidoxypropyltrimethoxysilane and glycidoxypropyltriethoxysilane, mercapto-alkylalkoxysilanes, and reaction products of ethylenediamine with silylacrylates. Isocyanurates containing silicon groups such as 1, 3, 5-tris(trialkoxysilylalkyl) isocyanurates or mixtures thereof.

Pigments

10 The two-part moisture cure organopolysiloxane composition as described herein may further comprise one or more pigments and/or colorants which may be added if desired. The pigments and/or colorants may be coloured, white, black, metal effect, and luminescent e.g., fluorescent and phosphorescent. Pigments are utilized to colour the composition as required. Any suitable pigment may be utilized providing it is compatible with the composition herein. In two-part moisture cure
15 organopolysiloxane compositions pigments and/or coloured (non-white) fillers e.g., carbon black may be utilized in the catalyst package to colour the end sealant product.

Suitable white pigments and/or colorants include titanium dioxide, zinc oxide, lead oxide, zinc sulfide, lithopone, zirconium oxide, and antimony oxide.

Suitable non-white inorganic pigments and/or colorants include, but are not limited to, iron oxide
20 pigments such as goethite, lepidocrocite, hematite, maghemite, and magnetite black iron oxide, yellow iron oxide, brown iron oxide, and red iron oxide; blue iron pigments; chromium oxide pigments; cadmium pigments such as cadmium yellow, cadmium red, and cadmium cinnabar; bismuth pigments such as bismuth vanadate and bismuth vanadate molybdate; mixed metal oxide pigments such as cobalt titanate green; chromate and molybdate pigments such as chromium yellow,
25 molybdate red, and molybdate orange; ultramarine pigments; cobalt oxide pigments; nickel antimony titanates; lead chrome; carbon black; lampblack, and metal effect pigments such as aluminium, copper, copper oxide, bronze, stainless steel, nickel, zinc, and brass.

Suitable organic non-white pigments and/or colorants include phthalocyanine pigments, e.g. phthalocyanine blue and phthalocyanine green; monoarylide yellow, diarylide yellow,
30 benzimidazolone yellow, heterocyclic yellow, DAN orange, quinacridone pigments, e.g. quinacridone magenta and quinacridone violet; organic reds, including metallized azo reds and nonmetallized azo reds and other azo pigments, monoazo pigments, diazo pigments, azo pigment lakes, β -naphthol pigments, naphthol AS pigments, benzimidazolone pigments, diazo condensation pigment, isoindolinone, and isoindoline pigments, polycyclic pigments, perylene and perinone
35 pigments, thioindigo pigments, anthrapyrimidone pigments, flavanthrone pigments, anthanthrone

pigments, dioxazine pigments, triarylcarbonium pigments, quinophthalone pigments, and diketopyrrolo pyrrole pigments.

Typically, the pigments and/or colorants, when particulates, have average particle diameters in the range of from 10 nm to 50 μm , preferably in the range of from 40 nm to 2 μm . The pigments and/or
5 colorants when present are present in the range of from 2, alternatively from 3, alternatively from 5 to 20 wt. % of the catalyst package composition, alternatively to 15 wt. % of the catalyst package composition, alternatively to 10 wt. % of the catalyst package composition.

Flame Retardants

Flame retardants may include aluminium trihydroxide and magnesium dihydroxide, iron oxides,
10 triphenyl phosphate, dimethyl methylphosphonate, tris(2,3-dibromopropyl) phosphate (brominated tris), halogenated flame retardants such as chlorinated paraffins and hexabromocyclododecane, and mixtures or derivatives thereof.

Antioxidants

Any suitable antioxidant(s) may be utilized, if deemed required. Examples may include: ethylene
15 bis (oxyethylene) bis(3-tert-butyl-4-hydroxy-5(methylhydrocinnamate) 36443-68-2; tetrakis[methylene(3,5-di-tert-butyl-4-hydroxy hydrocinnamate)]methane 6683-19-8; octadecyl 3,5-di-tert-butyl-4-hydroxyhydrocinnamate 2082-79-3; N,N'-hexamethylene-bis (3,5-di-tert-butyl-4-hydroxyhydrocinnamamide) 23128-74-7; 3,5-di-tert-butyl-4-hydroxyhydrocinnamic acid,C7-9
20 branched alkyl esters 125643-61-0; N-phenylbenzene amine, reaction products with 2,4,4-trimethylpentene 68411-46-1; e.g. anti-oxidants sold under the Irganox[®] name from BASF.

UV and/or light stabilizers

UV and/or light stabilizers may include, for the sake of example include benzotriazole, ultraviolet
light absorbers and/or hindered amine light stabilizers (HALS) such as the TINUVIN[®] product line
from Ciba Specialty Chemicals Inc.

25 Biocides

Biocides may additionally be utilized in the two-part moisture cure organopolysiloxane composition
if required. It is intended that the term "biocides" includes bactericides, fungicides and algicides, and
the like. Suitable examples of useful biocides which may be utilized in compositions as described
herein include, for the sake of example:

30 Carbamates such as methyl-N-benzimidazol-2-ylcarbamate (carbendazim) and other suitable carbamates, 10, 10'-oxybisphenoxarsine, 2-(4-thiazolyl)-benzimidazole,
N-(fluorodichloromethylthio)phthalimide, diiodomethyl p-tolyl sulfone, if appropriate in
combination with a UV stabilizer, such as 2,6-di(tert-butyl)-p-cresol, 3-iodo-2-propinyl
butylcarbamate (IPBC), zinc 2-pyridinethiol 1-oxide, triazolyl compounds and isothiazolinones,
35 such as 4,5-dichloro-2-(n-octyl)-4-isothiazolin-3-one (DCOIT), 2-(n-octyl)-4-isothiazolin-3-one
(OIT) and n-butyl-1,2-benzisothiazolin-3-one (BBIT). Other biocides might include for example

Zinc Pyridinethione, 1-(4-Chlorophenyl)-4,4-dimethyl-3-(1,2,4-triazol-1-ylmethyl)pentan-3-ol and/or 1-[[2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl] methyl]-1H-1,2,4-triazole.

The fungicide and/or biocide may suitably be present in an amount of from 0 to 0.3 wt. % of the catalyst package composition and may be present in an encapsulated form where required such as described in EP2106418.

Base Part

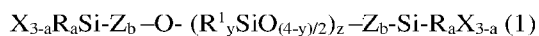
Any suitable base part may be utilized. For example, the base part may comprise:

- (a) A siloxane polymer having at least two terminal hydroxyl or hydrolysable groups having a viscosity of from 1000 to 200,000 mPa.s at 25 °C;
- (b) One or more reinforcing fillers; and optionally
- (c) One or more non-reinforcing fillers

Unless otherwise indicated all viscosity measurement given are zero-shear viscosity (η_0) values, obtained by extrapolating to zero the value taken at low shear rates (or simply taking an average of values) in the limit where the viscosity-shear rate curve is rate-independent, which is a test-method independent value provided a suitable, properly operating rheometer is used. For example, the zero-shear viscosity of a substance at 25 °C may be obtained by using an Anton-Parr MCR-301 or a TA Instruments AR-2000 rheometer equipped with cone-and-plate fixtures of suitable diameter to generate adequate torque signal at a series of low shear rates, such as 0.01 s⁻¹, 0.1 s⁻¹ and 1.0 s⁻¹ while not exceeding the torque limits of the transducer.

Alternatively, the viscosity measurements may be obtained using an ARES-G2 rotational rheometer, commercially available from TA Instruments using a steady rate sweep from 0.1 to 10 s⁻¹ on a 25 mm cone and plate. If the zero-shear plateau region cannot be observed at shear rates accessible to the rheometer or viscometer, we report the viscosity measured at a standard shear rate of 0.1 s⁻¹ at 25 °C.

The base part may comprise (a) a siloxane polymer having at least two i.e., having 2 or more terminal hydroxyl or hydrolysable groups having a viscosity of from 1000 to 200,000 mPa.s at 25 °C, alternatively 2000 to 150000 mPa.s at 25 °C. The siloxane polymer (a) may be described by the following molecular Formula (1)



where

- a is 0, 1, 2 or 3,
- b is 0 or 1,
- z is an integer from 300 to 5000 inclusive,
- y is 0, 1 or 2 preferably 2.

At least 97% (i.e., from 97% to 100%) of the R¹_ySiO_{(4-y)/2} are characterized with y=2.

- X is a hydroxyl group or any condensable or any hydrolyzable group,
- Each Z is independently selected from an alkylene group having from 1 to 10 carbon atoms

Each R is individually selected from aliphatic organic groups selected from alkyl, aminoalkyl, polyaminoalkyl, epoxyalkyl or alkenyl alternatively alkyl, aminoalkyl, polyaminoalkyl, epoxyalkyl groups having, in each case, from 1 to 10 carbon atoms per group or alkenyl groups having in each case from 2 to 10 carbon atoms per group or is an aromatic group, alternatively an aromatic group having from 6 to 20 carbon atoms, alternatively a phenyl group. R of the siloxane polymer (a) may comprise a maximum of 20 mol. % of aromatic groups, alternatively a maximum of 10 mol. % of aromatic groups, alternatively a maximum of 5 mol. % of aromatic groups, alternatively siloxane polymer (a) contains no aromatic groups. Most preferred are the methyl, ethyl, octyl, vinyl, and allyl groups.

Each R¹ is individually selected from the group consisting of X, alkyl groups, alternatively alkyl groups having from 1 to 10 carbon atoms, alkenyl groups alternatively alkenyl groups having from 2 to 10 carbon atoms and aromatic groups. In the case of aromatic groups, R¹ of the siloxane polymer (a) may comprise a maximum of 20 mol. % of aromatic groups, alternatively a maximum of 10 mol. % of aromatic groups, alternatively a maximum of 5 mol. % of aromatic groups, alternatively siloxane polymer (a) contains no aromatic groups. Most preferred are methyl, ethyl, octyl, trifluoropropyl, vinyl and phenyl groups. It is possible that some R¹ groups may be siloxane branches off the polymer backbone which may have terminal groups as hereinbefore described. Most preferred R¹ is methyl.

Each X group of siloxane polymer (a) may be the same or different and can be a hydroxyl group or a condensable or hydrolyzable group. The term "hydrolyzable group" means any group attached to the silicon which is hydrolyzed by water at room temperature. The hydrolyzable group X includes groups of the Formula -OT, where T is an alkyl group such as methyl, ethyl, isopropyl, octadecyl, an alkenyl group such as allyl, hexenyl, cyclic groups such as cyclohexyl, phenyl, benzyl, beta-phenylethyl; hydrocarbon ether groups, such as 2-methoxyethyl, 2-ethoxyisopropyl, 2-butoxyisobutyl, p-methoxyphenyl or $-(\text{CH}_2\text{CH}_2\text{O})_2\text{CH}_3$; or any N,N-amino radical, such as dimethylamino, diethylamino, ethylmethylamino, diphenylamino or dicyclohexylamino. The most preferred X groups are hydroxyl groups or alkoxy groups. Illustrative alkoxy groups are methoxy, ethoxy, propoxy, isopropoxy, butoxy, isobutoxy, pentoxy, hexoxy octadecyloxy and 2-ethylhexoxy; dialkoxy radicals, such as methoxymethoxy or ethoxymethoxy and alkoxyaryloxy, such as ethoxyphenoxy. The most preferred alkoxy groups are methoxy or ethoxy.

Each Z is independently selected from an alkylene group having from 1 to 10 carbon atoms. In one alternative each Z is independently selected from an alkylene group having from 2 to 6 carbon

atoms; in a further alternative each Z is independently selected from an alkylene group having from 2 to 4 carbon atoms.

Siloxane polymer (a) of the base part can be a single siloxane represented by Formula (1) or it can be mixtures of siloxanes represented by the aforesaid formula. The term "siloxane polymer mixture" in respect to component (a) of the base part is meant to include any individual siloxane polymer (a) or mixtures of siloxane polymers (a). In one embodiment herein any such mixture does not contain Siloxane polymers (a) comprising aromatic groups. As used herein, the term "silicone content" means the total amount of silicone used in the base part and the catalyst package, irrespective of the source, including, but not limited to the siloxane polymer (a), polymer mixtures, and/or resins.

As previously discussed, the number average Degree of Polymerization (DP), (i.e., in the above formula substantially z), describes the average number of monomeric units in a macromolecule or polymer or oligomer molecule of silicone. Synthetic polymers invariably consist of a mixture of macromolecular species with different degrees of polymerization and therefore of different molecular weights. There are several commonly defined average polymer molecular weights representing various moments of the molecular weight distribution, which can be measured with different techniques. The two most widely reported are the number average molecular weight (Mn) and the weight average molecular weight (Mw). The Mn and Mw of a linear silicone polymer can be determined by Gel permeation chromatography (GPC) in a solvent like toluene using polystyrene calibration standards with precision of about 10-15%. This technique is standard and yields Mw, Mn and polydispersity index (PI). $PI=Mw/Mn$.

Siloxane polymer (a) is going to be present in an amount of from 20 to 90 wt. %, alternatively 20 to 80 wt. % of the base part composition, alternatively from 35 to 65 wt.% of the base part composition.

Reinforcing filler (b)

The reinforcing filler (b) of the base part may contain one or more finely divided, reinforcing fillers such as calcium carbonate, high surface area fumed silica and/or precipitated silica including, for example, rice hull ash. Again, typically the surface area of the reinforcing filler (b) is at least 15 m²/g in the case of precipitated calcium carbonate measured in accordance with the BET method in accordance with ISO 9277: 2010, alternatively 15 to 50 m²/g, alternatively, 15 to 25 m²/g in the case of precipitated calcium carbonate. Silica reinforcing fillers have a typical surface area of at least 50 m²/g. In one embodiment reinforcing filler (v) is a precipitated calcium carbonate, precipitated silica and/or fumed silica; alternatively, precipitated calcium carbonate. In the case of high surface area fumed silica and/or high surface area precipitated silica, these may have surface areas of from 75 to 400 m²/g measured using the BET method in accordance with ISO 9277: 2010, alternatively of from 100 to 300 m²/g using the BET method in accordance with ISO 9277: 2010.

Typically, the reinforcing fillers are present in the base part composition in an amount of from 10 to 80 wt. % of the base part composition, alternatively 20 to 70 wt. % of the base part composition, alternatively from 35 to 65% wt. % of the base part composition.

Non-Reinforcing Filler (c)

- 5 The optional non-reinforcing filler (c) of the base part may comprise non-reinforcing fillers such as crushed quartz, diatomaceous earths, barium sulphate, iron oxide, titanium dioxide and carbon black, talc, wollastonite. Other fillers which might be used alone or in addition to the above include aluminite, calcium sulphate (anhydrite), gypsum, calcium sulphate, magnesium carbonate, clays such as kaolin, aluminium trihydroxide, magnesium hydroxide (brucite), graphite, copper carbonate, 10 e.g., malachite, nickel carbonate, e.g., zarachite, barium carbonate, e.g., witherite and/or strontium carbonate e.g., strontianite.

- Aluminium oxide, silicates from the group consisting of olivine group; garnet group; aluminosilicates; ring silicates; chain silicates; and sheet silicates. The olivine group comprises silicate minerals, such as but not limited to, forsterite and Mg_2SiO_4 . The garnet group comprises 15 ground silicate minerals, such as but not limited to, pyrope; $Mg_3Al_2Si_3O_{12}$; grossular; and $Ca_2Al_2Si_3O_{12}$. Aluminosilicates comprise ground silicate minerals, such as but not limited to, sillimanite; Al_2SiO_5 ; mullite; $3Al_2O_3 \cdot 2SiO_2$; kyanite; and Al_2SiO_5 .

- The ring silicates group comprises silicate minerals, such as but not limited to, cordierite and $Al_3(Mg,Fe)_2[Si_4AlO_{18}]$. The chain silicates group comprises ground silicate minerals, such as but not 20 limited to, wollastonite and $Ca[SiO_3]$.

- The sheet silicates group comprises silicate minerals, such as but not limited to, mica; $K_2Al_4[Si_6Al_2O_{20}](OH)_4$; pyrophyllite; $Al_4[Si_8O_{20}](OH)_4$; talc; $Mg_6[Si_8O_{20}](OH)_4$; serpentine for example, asbestos; Kaolinite; $Al_4[Si_4O_{10}](OH)_8$; and vermiculite. The optional non-reinforcing filler, when present, is present in an amount up to 20 wt.% of the base.

- 25 In addition, a surface treatment of the reinforcing filler (b) of the base part and optional non-reinforcing filler (c) of the base part may be performed as described above, for example with a fatty acid or a fatty acid ester such as a stearate, or with organosilanes, organosiloxanes, or organosilazanes hexaalkyl disilazane or short chain siloxane diols to render the filler(s) hydrophobic and therefore easier to handle and obtain a homogeneous mixture with the other sealant components 30 The surface treatment of the fillers makes them easily wetted by siloxane polymer (a) of the base part. These surface modified fillers do not clump and can be homogeneously incorporated into the silicone polymer (a) of the base part. This results in improved room temperature mechanical properties of the uncured compositions.

- The proportion of such fillers when employed will depend on the properties desired in the two-part 35 moisture cure organopolysiloxane composition and the cured elastomer. Filler (b) is going to be present in an amount of from 10 to 80 wt.% of the base part composition.

In the two-part moisture cure organopolysiloxane compositions, the base part comprises:

- 10 to 90 wt. % of siloxane polymer (a);
- 10 to 80 wt. % reinforcing fillers (b);
- 0 to 25 wt. % of non-reinforcing fillers (c);

5 with the total wt. % of the base part being 100 wt. %

and the catalyst package part comprises:

- carrier fluid (i) in an amount of from 30 to 80 wt. % of the catalyst package composition, alternatively 40 to 65 wt. % of the catalyst package;
- cross-linker (ii) in an amount of 0.5 to 25 wt. % of the catalyst package alternatively 2 to 20
- 10 wt. % of the catalyst package;
- aminosilane (iii) in an amount of from 5 to 25 wt. % of the catalyst package, alternatively 2 to 20 wt. % of the catalyst package;
- tin-based catalyst (iv) in an amount of from 0.01 to 3 wt. % of the catalyst package; alternatively, 0.05 to 1.5 wt. % of the catalyst package, alternatively, 0.05 to 0.75 wt. % of the
- 15 catalyst package; and optionally
- a reinforcing filler, a non-reinforcing filler or a mixture of reinforcing filler and non-reinforcing filler (v) in an amount of from in an amount of from 0 to 50 wt. % depending on the mixing ratio of the two-parts of the composition;

with the total wt. % of the catalyst package being 100 wt. %.

20 In the two-part moisture cure organopolysiloxane compositions, the components of each part are mixed together in amounts within the ranges given above and then the base part composition and the catalyst package composition are inter-mixed in a predetermined weight ratio e.g. base part composition : catalyst package composition of from 15:1 to 1:1, for example from 14 : 1 or 12.5 : 1 or 10: 1 or 9 : 1, or 8 : 1 or 7 : 1 or 6 : 1 or 5 : 1 or 4 : 1 or 3 : 1 or 2 : 1; alternatively is from 15:1 to

25 7:1. If the intended mixing ratio of the base part: catalyst package is 15:1 or greater, no reinforcing filler will be generally utilized in the catalyst package. However, if the intended mixing ratio of the base part : catalyst package is less than 15:1 an increasing amount filler will be utilized in the catalyst package up to the maximum of 50 wt. % of the catalyst package, if the intended ratio is 1:1. The moisture curable compositions can be prepared by mixing the ingredients employing any

30 suitable mixing equipment. In use the base part and the catalyst package are mixed together in the predefined ratios in a suitable mixer and then the resulting mixture is applied onto a target substrate surface.

A two-part moisture cure organopolysiloxane composition when utilized as a sealant composition as may be a gunnable sealant composition used for

35 (i) space/gap filling applications;

- (ii) seal applications, such as sealing the edge of a lap joint in a construction membrane; or
- (iii) seal penetration applications, e.g., sealing a vent in a construction membrane;
- (iv) adhering at least two substrates together;
- (v) a laminating layer between two substrates to produce a laminate of the first substrate,

5 the sealant product and the second substrate.

In the case of two-part moisture cure organopolysiloxane compositions e.g., silicone sealant compositions as hereinbefore described, there is also provided a method for filling a space between two substrates so as to create a seal therebetween, comprising:

- 10 a) providing a two-part moisture cure organopolysiloxane composition comprising a base part and a catalyst package composition as hereinbefore described, and either
- b) applying the two-part moisture cure organopolysiloxane composition comprising a base part and a catalyst package to a first substrate, and bringing a second substrate in contact with the two-part moisture cure organopolysiloxane compositions comprising a base part and a catalyst package that has been applied to the first substrate, or
- 15 c) filling a space formed by the arrangement of a first substrate and a second substrate with the two-part moisture cure organopolysiloxane composition comprising a base part and a catalyst package and curing.

Resulting two-part moisture cure organopolysiloxane compositions containing catalyst packages as hereinbefore described may be employed in a variety of applications, for example as coating, 20 caulking, mold making and encapsulating materials for use with substrates such as glass, aluminium, stainless steel, painted metals, powder-coated metals, and the like. In particular, they are for use in construction and/or structural glazing and/or insulating glazing applications. For example, an insulating glass unit and/or building façade element e.g., a shadow box and/or structural glazing unit and/or a gas filled insulation construction panel, which in each case is sealed with a silicone sealant 25 composition as hereinbefore described. Other potential applications include as a lamp adhesive, e.g., for LED lamps, solar, automotive, electronics and industrial assembly and maintenance applications. It may also be used for weather proofing.

Examples

Unless otherwise indicated all viscosity measurement given are zero-shear (η_0) viscosity values as 30 defined previously, obtained using an ARES-G2 rotational rheometer, (TA Instruments). Measurements were obtained using a steady rate sweep from 0.1 to 10 s⁻¹ with a 25 mm cone and plate fixture. The reported values are an average and the polymers all displayed non-Newtonian behavior in that the viscosity was consistent across the shear rate range.

Furthermore, the number average molecular weight (Mn) values provided below were determined 35 using a Waters 2695 Separations Module equipped with a vacuum degasser, and a Waters 2414 refractive index detector (Waters Corporation of MA, USA). The analyses were performed using

certified grade toluene flowing at 1.0 mL/min as the eluent, using polystyrene calibration standards. Data collection and analyses were performed using Waters Empower™ GPC software (Waters Corporation of MA, USA).

5 A series of catalyst packages were prepared as Examples 1 to 8 (Ex. 1 to Ex.8) and comparative examples 1 and 2 (C. 1 & C. 2). The compositions for each catalyst package prepared are provided in Tables 1a (Ex. 1 to Ex. 5), 1b (Ex. 6 to Ex. 8 and C. 1) and 1c (C. 2) below. Ex. 1, 4 – 7 used two alternative polyarylorganosiloxane polymers as carrier fluid (i) and the remaining examples Ex. 2, 3 and 8 used silicone copolymers in accordance with this disclosure. The comparative composition C. 1 used the same ingredients other than the carrier fluid which is an industry standard trimethylsiloxy-terminated polydimethylsiloxane. In comparative C. 2 the carrier fluid was also an industry standard trimethylsiloxy-terminated polydimethylsiloxane, but with different combinations of silanes.

15 In a preliminary step, each of the polyarylorganosiloxane polymers and silicone copolymers used in Ex. 1 to Ex. 8 as described below as well as the comparative alkyl-terminated diorganopolysiloxane used in C. 1 were screened for miscibility by mixing each one with aminosilanes used in the compositions (i.e. (ethylenediaminepropyl)trimethoxysilane and the reaction product of aminopropyltriethoxysilane with glycidoxypropyltrimethoxysilane and methyltrimethoxysilane) using a Speedmixer™ DAC 600.2 VAC-P mixing device commercially available from Flacktek. The mixtures were visually assessed for initial miscibility and watched over time for phase separation.

20 In each case with the polyarylorganosiloxane polymers and silicone copolymers used in Ex. 1 to Ex. 8 a clear mixture was observed immediately after initial mixing indicating miscibility and no phase separation was observed over time. In comparison the comparative alkyl-terminated diorganopolysiloxane was hazy upon mixing, and within 24 hours displayed distinct phase separation.

25 The carbon black used in the following examples was SR511 commercially available from Tokai Carbon CB Ltd.

The Fumed silica used in the examples was Aerosil™ R974 commercially available from Evonik treated with dimethyldichlorosilane.

30 The full compositions were then prepared in accordance with Table 1a, 1b and 1c below.

Table 1a: Catalyst Package Compositions in wt. % of Ex. 1 to 5

Component	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5
Polymer 1	45.7			10	20
Polymer 2		10	20		
Ground calcium carbonate		35.6	25.6	35.6	25.6
Carbon Black	17.3	17.3	17.3	17.3	17.3
Reaction product of Aminopropyltriethoxysilane with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane	13	13	13	13	13
Methyltrimethoxysilane	13	13	13	13	13
(Ethylenediaminepropyl)trimethoxysilane	5	5	5	5	5
Bis(trimethoxysilyl)hexane	4	4	4	4	4
Fumed silica	1.9	2.0	2.0	1.9	1.9
Dimethyltin dioneodecanoate (DMTDN)	0.1	0.1	0.1	0.1	0.1

Polymer 1 was a Vinyltrimethylsiloxy-terminated phenylmethyl siloxane having a number average structure of $M^{(Vi)}-D^{(Ph)}_{23} - M^{(Vi)}$ and a zero-shear viscosity (η_0) of 3600 mPa.s at 25 °C.

- 5 Polymer 2 was a vinyltrimethylsiloxy-terminated dimethyl-diphenyl siloxane random copolymer having a number average structure $M^{(Vi)}-D_{210} - D^{(Ph2)}_{50} - M^{(Vi)}$ and a η_0 of 12,000 mPa.s at 25 °C. The ground calcium carbonate used in all examples was Calatem™ C16T commercially available from PROVENCALE S.A.

10

Table 1b: Catalyst Package Compositions in wt. % of Ex. 6 to 8 and C. 1

Component	Ex. 6	Ex. 7	C. 1	Ex. 8
Polymer 3	10	20		
trimethylsilyl-terminated polydimethylsiloxane having η_0 of 60,000 mPa.s at 25 °C			45.7	
Polymer 4				56.56
Ground calcium carbonate	35.6	25.6		
Carbon Black	17.3	17.3	17.3	
Reaction product of Aminopropyltriethoxysilane with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane	13	13	13	16.09
Methyltrimethoxysilane	13	13	13	16.09
(Ethylenediaminepropyl)trimethoxysilane	5	5	5	6.19
Bis(trimethoxysilyl)hexane	4	4	4	4.95
Fumed silica	2	2	2	
Dimethyltin dineodecanoate (DMTDN)	0.1	0.1	0.1	0.12

Polymer 3 is Vinyl dimethyl siloxy-terminated phenylmethyl siloxane having a number average structure of $M^{(Vi)}-D^{(Ph)}_{92}-M^{(Vi)}$ and a η_0 of 50,000 mPa.s at 25 °C.

- 5 Polymer 4 was a Trimethylsilyloxy-terminated Dimethyl methyl(2-phenylpropyl) siloxane, having a number average structure of $M^{(Vi)}-D_{38}-D^{(2-Ph-p)}_{33}-M^{(Vi)}$ (where 2-Ph-p = 2-phenylpropyl) and a η_0 of about 1400 mPa.s at 25 °C.

Table 1c: Composition of Comparative Example 2 (C. 2) (wt. %)

Component	wt. %
trimethylsilyl-terminated polydimethylsiloxane having a η_0 of 60,000 mPa.s at 25 °C	48.75
Tetraethylorthosilicate	17.39
Bis(3-triethoxysilylpropyl)amine	17.39
Carbon black	12.68
Fumed silica	3.58
Dimethyltin dineodecanoate (DMTDN)	0.21

10

The catalyst package compositions used were prepared on a SpeedMixer™ DAC 600.2 VAC-P mixing device using 300 Max Tall cups. In each instance, All the ingredients, excepting silica,

ground calcium carbonate and carbon black, were first mixed together at 1200 revolutions per minute (rpm) for 60 seconds to form a mixture. The silica was then introduced into the mixture in two sequential batches with mixing at 1500 rpm for a further minute after each addition. The mixing cup was then scraped down before the introduction of the ground calcium carbonate non-reinforcing filler. The ground calcium carbonate was introduced in 3 equal parts with mixing at 1500 rpm for a further minute after each addition with the mixing cup being scraped down after the introduction of the third and final part thereof. The carbon black was then introduced, also in 3 equal parts with mixing at 1500 rpm for a further minute and scraping down the mixture after each addition. During the above preparation steps the compositions were continuously deaired continuously sequentially as follows:

30 seconds (s) at 800 revolutions per minute (rpm) and 5psi (34.47kPa), then
 30s at 1500 rpm and 5psi (34.47kPa), then
 30s at 800 rpm and 14.7psi (101.35 kPa) and then repeat sequentially without interruption.

A standard base part composition was used for all the examples and this is detailed in Table 1d below.

Table 1d: Composition of Base part used for each example (wt. %)

Component	Base (wt. %)
Treated precipitated calcium carbonate	48
Hydroxydimethyl terminated polydimethylsiloxane having a η_0 of 5000 mPa.s @ 25 °C	52

The precipitated calcium carbonate used in the base composition herein was WINNOFIL™ SPM commercially available from Imerys which had been treated with a synthetic fatty acid. In each instance the resulting catalyst package was mixed by loading ten parts by weight of base to one-part by weight of the catalyst package in 300 Tall Speedmixer cup, then mixing on a Speedmixer™ DAC 600.2 VAC-P mixing device for one minute at 800 rpm. The resulting mixture then scraped from the bottom and sides of the cup and mixed 20 seconds at 1200 rpm. Once the mixing process had completed the resulting final composition was transferred to a Semco® tube using a hand-operated cup press.

The resulting composition was then dispensed to prepare and cure the necessary test pieces used in the following physical property and adhesion etc. testing described below. it is known that phenylsiloxanes are incompatible with dimethylsiloxanes such as the preferred polymers (a) above. Hence, it was unexpected that when the base and curing agent were mixed together that the final

two-part composition would cure and adhere effectively without a loss in rate of development of the properties.

Shore A Durometer

5 The final Shore A durometer value which was taken after curing for 7 days at room temperature (approximately 25 °C). Shore A durometer was tested in accordance with ASTM D 2240 using a Shore® Conveloader CV-71200 type A. Samples were stacked ½” (1.27cm) thick, and values reported are an average of three.

Tensile Strength, Elongation and Modulus

10 Tensile strength, elongation and modulus results were tested in accordance with ASTM D 412 - 06, test method A. A 100 mil (2.54mm) thick slab of material was drawn down on a polyethylene terephthalate (PET) surface and cured seven days at room temperature and 50% relative humidity (RH). Dogbones were cut using die DIN S2 and pulled on an Alliance R/5 testing machine (MTS Systems Corp.) at 20.0 in/min (50.8cm per minute) using a 5 kN load cell. Data were collected and analyzed using MTS Test Works Elite software v. 2.3.6. The results are Tabulated in Table 2a.

15

Table 2a: Shore A Durometer, Tensile strength, Elongation and Modulus results after 7 Day RT Cure

	Durometer (Sh. A)	Tensile Strength (MPa)	Elongation at Break (%)	Modulus at 25% Extension (MPa)	Modulus at 50% Extension (MPa)	Modulus at 100% Extension (MPa)
Ex. 1	66	2.8	129	1.0	1.6	2.5
Ex. 2	67	2.7	94	1.2	1.9	xxx
Ex. 3	61	3.3	132	1.1	1.9	2.8
Ex. 4	68	2.9	105	1.2	1.9	xxx
Ex. 5	68	2.4	74	1.2	1.9	xxx
Ex. 6	66	3.3	140	1.1	1.8	2.7
Ex. 7	68	3.1	118	1.1	1.9	2.9
C. 1	55	3.2	189	0.9	1.3	2.1
C. 2	56	3.3	486.3	0.7	1.1	2.0

Adhesion Peel Testing

20 Adhesion peel testing was undertaken according to a modified version of ASTM C794 on test pieces of conventional architectural glass. One of the glass test pieces utilized were coated with a commercial reflective coating Viracon™ VP-13 from Viracon (referred to in the Table 2b below as Reflective Coating 1).

The substrates (as identified in Table 2c below) were prepared by wiping twice with isopropyl alcohol (IPA) and air dried. Stainless steel screens (20 x 20 x 0.016") (50.8 x 50.8 x 0.0406cm), 0.5" thick (1.27cm) in width were prepared by cleaning with xylene and priming with DOWSIL™ 1200 OS Primer from Dow Silicones Corporation and drying for 24 hours after each step. A bead of mixed sealant was applied to the substrate and drawn down to 1/8" (0.3175cm) thickness. Next, the screen was lightly pressed into the sealant, and a second bead of sealant was applied onto the screen and drawn down to 1/4" (0.635cm) total thickness. Prior to testing, a fresh score mark was created with a knife at the substrate/sealant interface just below the screen. The adhesion peel strength was measured by pulling the screen 180° at 2.0 in/min (5.08cm per minute) using an Instron 33R 4465 with a 5 kN load cell. Data was collected and analyzed using Bluehill v. 2.8 software. Reported values are an average of three replicates.

Cohesive failure (CF) is observed when a cured material breaks without detaching from a substrate to which it is adhered. Adhesive failure (AF) refers to the situation when the cured material detaches cleanly (i.e., peels off) from a substrate. In some cases, a mixed failure mode may be observed: where there is a mixture of AF and CF. In such a situation the proportions of surface displaying CF (%CF) and AF (%AF) behavior are determined with % CF + % AF=100%.

Table 2b: The adhesion peel strength after 24 hours

	Reflective Coating 1		Glass	
	N/mm	CF (%)	N/mm	CF (%)
Ex. 1	2.3	100	2.0	100
Ex. 2	2.6	100	2.3	100
Ex. 3	1.8	100	1.8	100
Ex. 4	2.5	100	2.6	100
Ex. 5	2.8	100	2.2	100
Ex. 6	2.9	93.3	3.2	100
Ex. 7	3.6	100	2.5	100
C. 1	4.7	100	Data not available	
C. 2	2.0	0	Data not available	

Table 2c: The adhesion peel strength after 7 Days

	Reflective coating		Glass	
	N/mm	CF (%)	N/mm	CF (%)
Ex. 1	1.9	100	1.3	70
Ex. 2	1.8	100	1.4	100
Ex. 3	1.4	100	1.6	100
Ex. 4	1.8	100	2.1	100
Ex. 5	2.0	100	1.9	100
Ex. 6	1.3	100	1.7	100
Ex. 7	1.8	100	1.7	100
C. 1	2.8	100	2.0	100
C. 2	3.1	0	2.5	100

- It can be seen in Table 2c that the inventive samples Ex. 1 to 3 are superior to C. 2 (WO2019027897) because they build adhesion to the referenced reflective coating within 24 hours.
- 5 This is a surprising result because the catalyst package of both the inventive samples and C. 2 comprise a fully compatible continuous phase. However, the aminosilane used in the inventive examples is incompatible with the industry standard trimethylsiloxy-terminated polydimethylsiloxane of C. 1 which can lead to phase separation in storage of the catalyst package. It was found that, when using carrier fluid (i) herein together with the other ingredients (ii) to (iv) and
- 10 optionally (v) of the catalyst package, a fully compatible, shelf stable continuous phase was generated. In particular it was found that the carrier fluid (i) and aminosilanes (iii) were miscible after initial mixing and did not separate over time. Hence, it was found that using the polyarylorganosiloxane polymers and silicone copolymers as described herein as carrier fluid (i) in the catalyst package enabled the use of aminosilanes as described herein in the catalyst package without
- 15 phase separation which is often seen after storage when the carrier fluid is the industry standard trimethylsiloxy-terminated polydimethylsiloxane. Using the polyarylorganosiloxane polymers and silicone copolymers as described herein as carrier fluid (i) improves shelf stability and reduces separation of the carrier fluid (i) from the aminosilanes (iii), while unexpectedly retaining the good cure and adhesion of 100% silicone formulations.
- 20 Furthermore, that it is further unexpected that, unlike the C. 1 and C. 2 comparative examples, the inventive samples utilize a carrier fluid in the catalyst package that is incompatible with the base, yet they show equivalent or superior bulk durometer build and adhesion for a given time of curing.

CLAIMS

1. A two-part moisture curing silicone composition having a base part and catalyst package part in which, the catalyst package comprises:
 - (i) a carrier fluid comprising one or more polyarylorganosiloxane polymers which comprise a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons; or
one or more silicone copolymers comprising a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5) - \text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons;
or a mixture thereof;
 - (ii) a cross-linker of the structure $\text{R}^7_a - \text{Si} - \text{R}^6_{4-a}$ wherein each R^7 is an alkoxy group having from 1 to 10 carbons, a ketoximino group or an alkenyloxy group; each R^6 is selected from is a non-hydrolysable silicon-bonded organic group, and a is 2, 3 or 4;
 - (iii) an aminosilane;
 - (iv) a tin-based catalyst and optionally
 - (v) a reinforcing filler, a non-reinforcing filler or a mixture of reinforcing filler and non-reinforcing filler.
2. A two-part moisture curing silicone composition in accordance with claim 1, wherein the base part may comprise:
 - (a) A siloxane polymer having at least two terminal hydroxyl or hydrolysable groups having a viscosity of from 1000 to 200,000 mPa.s at 25 °C;
 - (b) One or more reinforcing fillers; and optionally
 - (c) One or more non-reinforcing fillers.
3. A two-part moisture curing composition in accordance with any preceding claim characterised in that each R^4 of the carrier fluid (i) is a phenyl group or a substituted phenyl group.
4. A two-part moisture curing composition in accordance with any preceding claim characterised in that each polyarylorganosiloxane polymer or silicone copolymer may be linear, branched or cyclic.
5. A two-part moisture curing composition in accordance with any preceding claim characterised in that each silicone copolymer is a random or block silicone copolymer and/or comprises a plurality of repeating $-\text{Si}(\text{R}^{10})_2 - \text{O}-$ units wherein each R^{10} is the same or different and is a monovalent organic group having from 1 to 18 carbons selected from an alkyl group having from 1 to 18 carbon atoms; a hydrocarbonoxy group having from 1 to 18 carbon atoms; an alkoxy group having from 1 to 12 carbon atoms or an alkenyl group having from 1 to 12 carbon atoms.

6. A two-part moisture curing composition in accordance with any preceding claim characterised in that the weight ratio of the base part composition: catalyst package composition when to be mixed is between 15:1 and 1:1.
7. A two-part moisture curing composition in accordance with any preceding claim characterised in that when present the reinforcing filler (v) is selected from fumed silica, precipitated silicas and/or precipitated calcium carbonate.
8. A two-part moisture curing composition in accordance with any preceding claim characterised in that the catalyst packages comprises additional non-amino adhesion promoters, adhesion catalysts, flame retardants, one or more pigments and/or colorants, rheology modifiers, antioxidants, UV and/or light stabilizers and fungicides and/or biocides.
9. A two-part moisture curing composition in accordance with any preceding claim characterised in that the base part comprises
 - 10 to 90 wt. % of siloxane polymer (a);
 - 10 to 80 wt. % reinforcing fillers (b);
 - 0 to 20 Wt. % of non-reinforcing fillers (c);with the total wt. % of the base part being 100 wt. %.
10. A two-part moisture curing composition in accordance with any preceding claim characterised in that the catalyst package comprises:
 - carrier fluid (i) in an amount of from 30 to 80 wt. % of the catalyst package composition,
 - cross-linker (ii) in an amount of 0.5 to 25 wt. % of the catalyst package;
 - aminosilane (iii) in an amount of from 5 to 25 wt. % of the catalyst package;
 - tin-based catalyst (iv) in an amount of from 0.01 to 3 wt. % of the catalyst package;and optionally
 - a reinforcing filler, a non-reinforcing filler or a mixture of reinforcing filler and non-reinforcing filler (v) in an amount of from in an amount of from 0 to 50 wt. % depending on the mixing ratio of the two-parts of the composition;with the total wt. % of the catalyst package being 100 wt. %.
11. Use of the two-part moisture curing composition in accordance with any one of claims 1 to 10, as coating, caulking, mold making and encapsulating materials.
12. Use in accordance with claim 11 in construction and/or structural glazing and/or insulating glazing applications and/or building façade element and/or a gas filled insulation construction panel, solar applications, automotive applications, electronics applications, LED lighting and other electrical applications and industrial assembly and maintenance applications.
13. Use of one or more polyarylorganosiloxane polymers which comprise a plurality of repeating - [Si(R⁴)(R⁵) - O]- units wherein each R⁴ is a monovalent substituent comprising an aromatic group

having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons;
or

one or more silicone copolymers comprising a plurality of repeating $-\text{Si}(\text{R}^4)(\text{R}^5)-\text{O}-$ units wherein each R^4 is a monovalent substituent comprising an aromatic group having from 6 to 18 carbons and each R^5 is a monovalent organic group having from 1 to 18 carbons;

or a mixture thereof;

as a carrier fluid (i) in a catalyst package otherwise comprising;

- (ii) a cross-linker of the structure $\text{R}^7_a-\text{Si}-\text{R}^6_{4-a}$ wherein each R^7 is an alkoxy group having from 1 to 10 carbons, a ketoximino group or an alkenyloxy group; each R^6 is selected from is a non-hydrolysable silicon-bonded organic group, and a is 2, 3 or 4;
- (iii) an aminosilane;
- (iv) a tin-based catalyst and optionally
- (v) a reinforcing filler, a non-reinforcing filler or a mixture of reinforcing filler and non-reinforcing filler;

in a two-part moisture curing silicone composition having a base part and the aforementioned catalyst package part.

14. Use of polyarylorganosiloxane polymers and or silicone copolymers in accordance with claim 13 characterised in that each R^4 of the carrier fluid (i) is a phenyl group or a substituted phenyl group.

15. Use of silicone copolymers in accordance with claim 13 or 14 characterised in that each silicone copolymer is a random or block silicone copolymer and/or comprises a plurality of repeating $-\text{Si}(\text{R}^{10})_2-\text{O}-$ units wherein each R^{10} is the same or different and is a monovalent organic group having from 1 to 18 carbons selected from an alkyl group having from 1 to 18 carbon atoms; a hydrocarbonoxy group having from 1 to 18 carbon atoms; an alkoxy group having from 1 to 12 carbon atoms or an alkenyl group having from 1 to 12 carbon atoms.