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PATENT SPECIFICATION

(11) 1 559 455

(21) Application No. 1178/79 (22) Filed 27 Oct. 1977
(62) Divided out of No. 1559454
(31) Convention Application No. 739162
(32) Filed 5 Nov. 1976 in
(33) United States of America (US)
(44) Complete Specification published 16 Jan. 1980
(51) INT CL³ C08L 83/04
(52) Index at acceptance
C3T 6D1A 6D1B 6D2B 6D7 6D9 6F2 6K2A 6K2X 6K8C

(19)

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(54) IMPROVEMENTS IN SILICONE RUBBERS

(71) We, GENERAL ELECTRIC COMPANY, a corporation organised and existing under the laws of the State of New York, United States of America, of 1 River Road, Schenectady 12305, State of New York, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates to silicone rubbers and in particular to a flame insulative two-part room temperature vulcanizable silicone rubber composition. The present invention relates to such composition having in them as the flame insulative additive from 25 to 150 parts of ground glass and more preferably, glass frits.

Attempts have been made to keep the white ash that is formed when a silicone elastomer around a cable was burned in place, by using glass braids around the silicone elastomer. However, with the use of such glass braids, the resultant cable was bulky and hard to work with in the construction and installation of electrical systems.

The approach for the protection of such electrical conducting wires or cables when there was utilized a two-part room temperature vulcanizable silicone rubber composition as a sealant that was cured in place upon mixing the two parts and forcing the material in the cavities in the cable and allowing the composition to cure to a silicone elastomer, was such that the silicone material was kept in place during the burning process by the configuration and shapes that it took as it filled the voids of the electrical cables. The use of such a room temperature vulcanizable silicone rubber composition and in such a use is known in the industry as a valley sealant. It was common when such room temperature vulcanizable silicone rubber compositions were utilized as valley sealants that jackets were inserted thereover, as an additional means for keeping the white ash that was formed from the burning silicone elastomer in place. However, as stated previously, the jackets burned even more rapidly than the silicone elastomer and, thus, were not very effective, such that the valley sealant, upon burning, formed a white ash and such white ash still tended to be moved in its position by the gases that escaped and that were formed by the burning of the silicone elastomer. Accordingly, it was highly desirable for such two-part room temperature vulcanizable silicone rubber compositions that were used as valley sealants to have added to them additives that would maintain their integrity and result in the white ash that was formed from the burning of the silicone elastomer being cohesive so that the white ash of the burned silicone elastomer would remain in place and act as a barrier between the flame and the electrical conducting wires that were being protected by such room temperature vulcanizable silicone rubber composition. It should also be noted that the use of platinum as well as carbon black and various other additives to two-part room temperature vulcanizable silicone rubber compositions, while increasing to some extent the flame insulativeness did not perform any function as far as allowing the cured silicone elastomer that was burned into a white ash to maintain its integrity.

There is provided by the present invention a two-part room temperature vulcanizable silicone rubber composition comprising (a) 100 parts by weight of silanol end-stopped diorganopolysiloxane having a viscosity varying from 1000 to 200,000 centipoise viscosity at 25°C; (b) from 25 to 150 parts by weight of ground glass having a size of up to 400 microns and a glass transition temperature of between 1000° and 1400°F; (c) from 50 to 300 parts by weight of an inert filler different from the ground glass of (b); and (d) from 1 to 15 parts by weight of a silicate having the formula,

$$R^1_aSi(OR^2)_{4-a}$$

and partial hydrolysis products thereof, where R^1 and R^2 are selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, a is 0 or 1, and (e) from 0.01 to 5 parts by weight of the metal salt of a carboxylic acid the metal varying from lead to manganese in the periodic table.

In this composition there may be utilized as an additional flame insulative additive so as to allow the composition, upon burning to a white ash, to maintain its integrity, glass fibers at a concentration of from 5 to 30 parts. The most preferred glass fibers that are utilized as an additional flame insulative additive in the composition of the instant case are milled glass fibers having the average size ranging from 0.01 to 1 inch in length and, more preferably, having an average size of anywhere from 0.01 to 0.5 inches in length.

The present invention includes 25 to 150 parts by weight of ground glass, preferably glass frits, the ground glass having a size of up to 400 microns, preferably from 50 to 400 microns, and having a melting point between 1000 to 1400°F.

The present invention also provides a process for forming a flame insulative room temperature vulcanizable silicone rubber composition comprising mixing at room temperature in the presence of ambient moisture (a) 100 parts by weight of a silanol end-stopped diorganopolysiloxane having a viscosity varying from 1,000 to 200,000 centipoise at 25°C, where the organo groups are selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals; (b) from 25 to 150 parts by weight of ground glass having a size of up to 400 microns and a glass transition temperature of between 1000 and 1400°F; (c) from 50 to 150 parts by weight of an inert filler different from the ground glass of (b); and (d) from 1 to 15 parts by weight of a silicate having the formula,

$$R^1_aSi(OR^2)_{4-a}$$

and partial hydrolysis products thereof where R^1 and R^2 are selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, a is 0 or 1 and (e) from 0.01 to 8 parts by weight of the metal salt of a carboxylic acid the metal varying from lead to manganese in the periodic table.

Room temperature vulcanizable silicone rubber compositions are cured by mixing at room temperature the one part which usually comprises the silanol end-stopped diorganopolysiloxane and the inert filler with the second part which usually comprises the alkyl silicate and the metal salt of a carboxylic acid.

The room temperature vulcanizable silicone rubber composition can have the usual ingredients or additional flame insulative ingredients in the composition to enhance their effectiveness. One additive, that is, a flame insulative additive, which was found to degrade the flame insulative properties of the instant composition was platinum. It was found that the presence of platinum with glass frits in the composition did not improve the flame insulative properties of the room temperature vulcanizable silicone rubber composition from such compositions having no special flame insulative additives or formulations.

In the present flame insulative composition set forth above, there must be 50 to 300 parts by weight of an inert filler. The inert filler is different from the ground glass component of the composition. Preferably, such an inert filler is selected from fumed silica and precipitated silica (known in the silicone art as reinforcing fillers). However, up to 100% of the total inert filler may be comprised of extending fillers. There is preferably employed finely divided silica based fillers of the highly reinforcing type which are characterised by particle diameter of less than 50 millicrons and by surface areas of greater than 50 square meters per gram. The extending fillers of others than those preferred above may be selected from titanium dioxide, iron oxide, aluminum oxide, as well as the other inorganic materials known as inert fillers which can be included among others, diatomaceous earth, calcium carbonate and quartz and can preferably be employed in combination with highly reinforcing silica fillers to improve the tensile strength or the hardness of the elastomeric product. Other examples of suitable fillers are, diatomaceous silica, alumina silicate, zinc oxide, zirconium silicate, barium sulfate, zinc sulfide, aluminum silicate and finely divided silica having surface bonded alkoxy groups.

As mentioned previously, up to 100% of such inert fillers should be of the extending type, preferably, the total filler for maximum structuring to impart flame insulative properties of the present case should be selected from fumed silica or precipitated silica. However, in certain instances part of such fillers, as stated previously, up to a maximum of 100% of the total filler may be any of the foregoing extending fillers.

The third necessary ingredient in the compositions of the present case is from 25 to 150 parts by weight of ground glass and more preferably 50 to 100 parts. A specific type of ground glass which is known as glass frits, is preferred. Briefly, such glass frits and most preferably such glass frits or ground glass have an average particle size of up to 400 microns and preferably from 50 microns to 400 microns. Although glass frits of a smaller size or a larger size can be utilised in the instant invention the most preferred glass frits utilised within the scope of the instant invention to produce the maximum structure flame insulative heat vulcanizable silicone rubber composition of the instant case is a glass frit having an average particle size within the above preferred range. By glass frits it is meant ground glass within the above particle size having a glass transition temperature between 1,000 and 1,400°F.

The present invention includes ground glass within the above particle size having the glass transition temperature as specified above, that is, a glass transition temperature between 1,000 to 1,400°F. As pointed out above, such a type of ground glass is usually known in the industry as glass frits. However, it may have other names and it is intended to specify as a critical ingredient in the flame insulative composition of the instant case ground glass within the above particle size having a glass transition temperature within the above ranges.

Accordingly these are all the necessary ingredients for the instant composition to provide a flame insulative heat vulcanizable silicone rubber composition which upon burning leaves a structured ash which is not blown away or easily removed and, thus, obviating the need for a jacket to hold the ash in place. As a result of this, the structured ash provides maximum flame insulative properties as against the flame and allows the electrical system to maintain its integrity. There may be added other well known ingredients to the composition either in preparing it so as to facilitate the process in mixing by the use of well known process aids, or also as additives to further improve the properties of the silicone rubber composition for certain applications. For instance, well known pigments may be added to the composition so that the cured heat vulcanizable silicone rubber composition will be within the proper colour code.

There may also be employed in the present composition 1 to 25 percent and preferably 5 to 15 percent by weight based on the polydiorganosiloxane gum of a process aid for preventing the gum and the filler mixture from structuring prior to curing and after compounding. One example of such a process aid is a compound of the formula,

$$XC(=O)(CH_3)_n\overset{R}{\underset{R}{Si}}O\left[\overset{R}{\underset{R}{Si}}O\right]_b\overset{R}{\underset{R}{Si}}(CH_3)_nC(=O)X$$

where R is a member selected from methyl and phenyl, X is a member selected from the class consisting of —OH, —NH_2 or —OR′, where R′ is methyl or ethyl, n has a value of from 2 to 4, inclusive, and b is 0 or a whole number equal to from 1 to 10, inclusive. Further details as to the properties, as well as the method of preparation of the compound of Formula (3), are to be found in the disclosure of Martellock, U.S. patent 3,464,945.

The process aid may also be a dihydrocarbon-substituted polysiloxane oil having a hydrocarbon substituent to silicon atom ratio of from 1.6 to 2.0 and whose hydrocarbon substituents comprise at least one member selected from methyl, ethyl, vinyl, allyl, cyclohexenyl and phenyl groups, said polysiloxane oil comprising polysiloxane molecules containing an average of from one to two lower alkoxy groups bonded to each of the terminal silicon atoms where the alkoxy groups are selected from methoxy, ethoxy, propoxy and butoxy.

Preparation of the alkoxy-containing hydrocarbon-substituted polysiloxane oils that can be employed as a process aid in the present invention can be carried out by producing one or more types of cyclic dihydrocarbon-substituted polysiloxanes from one or more types of dihydrocarbon-substituted dichlorosilanes and dialkoxysilanes in accordance with the hydrolysis, depolymerisation and fractional distillation procedures described in detail above with reference to the preparation of the gum of Formula (1). Then one or more types of cyclic siloxanes so produced are mixed with predetermined amounts of a dihydrocarbon-substituted dialkoxysilane and the mixture is subjected to an equilibration treatment under controlled conditions to produce the desired alkoxy end-blocked hydrocarbon-substituted linear polysiloxane oil.

The alkoxy-containing hydrocarbon-substituted polysiloxane oils suitable for use in the present invention are relatively low molecular weight polysiloxane oils whose polymer chains have at least four and as much as thirty-five and more dihydrocarbon siloxy units per molecule. The polysiloxane oils preferably have an average of at least one and not more than two alkoxy groups bonded to each of the terminal silicon atoms of the molecule. A more detailed disclosure of the alkoxy end-blocked polysiloxane process aids, as well as their method of preparation, is to be found in the disclosure of Fekete, U.S. patent 2,954,357.

There may also be used as a process aid hydroxylated organosilanes which contain from one silicon-bonded hydroxyl per 70 silicon atoms to two silicon-bonded hydroxyls per silicon atom and contains from 1.9 to 2.1 hydrocarbon radicals per silicon atom. The remaining valences of the silicon atom are satisfied by oxygen atoms. The hydroxylated and polymeric materials which contain two silicon-bonded OH groups in the molecule. In addition, the hydroxylated organosilane may be a mixture of hydroxyl-containing siloxanes and completely condensed siloxanes. Irrespective of the particular composition of the hydroxylated organosiloxane, it is necessary that there be present in said organosiloxane from one OH to 70 silicon atoms to two OH per silicon atom.

The hydroxylated siloxanes may be prepared by any suitable method, such as heating said siloxanes with steam under pressure at temperatures of about 120°C or hydrolyzing silanes of the formula R_nSiX_{4-n} where X is any hydrolyxable group such as Cl, OR, H, —OOR and R is a monovalent hydrocarbon radical. The former method is preferred for the preparation of those hydroxylated materials in which the hydrocarbon radicals are alkyl, while the latter method is best for the siloxanes in which hydrocarbon radicals are monocyclicaryl hydrocarbon radicals. Further, detailed information as to the hydroxylated organosiloxanes which may be used as process aids is to be found in Konkle et al, U.S. patent 2,890,188.

Any of the above process aids may be used alone or mixtures thereof may be used in the above-defined concentrations. Further, other suitable process aids may also be used in the silicone rubber compositions of the present invention.

For a maximum flame insulative effect it is desirable to also incorporate into the composition from 5 to 50, and preferably 5 to 30, parts by weight of glass fibers in addition to the ground glass (more commonly known as glass frits), more preferably at a concentration of 5 to 30 parts by weight of said glass fibers. Although more glass fibers than 50 parts can be added, the uncured composition becomes difficult to handle and the added glass fibers and such additional amount of fibers does not impart to the cured composition or uncured composition any additional flame insulative benefits, while if less than 5 parts of glass fibers are added the desired flame insulative effect is not obtained.

In the most preferred aspect of the instant invention for room temperature vulcanizable silicone rubber compositions, when the glass fibers are added to the composition for maximum flame insulative properties it is preferred that such glass fibers be milled glass fibers with a size varying from .01 to 0.5 inches. If the glass fibers are larger than 0.5 inches the desired structured ash of maximum flame insulative benefits is not obtained, and the materials become hard to process. If glass fibers of less than .01 inches are used, they do not markly add to the structureness of the burnt silicone ash that is formed. Accordingly, it is generally preferred that milled glass fibers be added, although any glass fibers may be added for some flame insulative effect in addition to the glass frits. It is generally preferred that such glass fibers have an average size, as stated previously, of between .01 to 0.5 inches and more preferably from 0.1 to 0.3 inches.

It should be pointed out that also within the general scope of the invention that the general range of fillers that may be added are 50 to 300 parts by weight per 100 parts of linear diorganopolysiloxane polymer, more preferably there may be utilised from 100 to 250 parts of an inert filler. In the preferred case, it is also desirable to add between 50 to 150 parts of the glass frits. However, it should be mentioned that the concept of the present invention is the addition of glass frits in sizable quantities in addition to the inert filler to obtain maximum flame insulativeness or specific flame insulativeness for a specific cable or electrical system application. In the same way, the use of glass fibers or the preferred milled glass fibers, for that matter, both in the use as well as the size of such milled glass fibers is optional, and such glass fibers do increase the flame insulativeness of the final composition. It can be categorically stated that the use of such preferred milled glass fibers in the instant composition will increase the flame insulativeness of the composition. However, the use of the milled glass fibers is optional unless greater flame insulativeness in the heat vulcanizable silicon rubber composition or room temperature vulcanizable silicone rubber composition is desired.

In addition to the foregoing ingredients to further increase the flame insulativeness of the heat vulcanizable silicone rubber composition or room temperature vulcanizable silicone rubber composition for maximum flame insulativeness there may be added from 5 to 30 parts of carbon black. However, as stated previously, such addition of carbon black is optional and is only to be added for specific applications.

It should be noted at this point that the addition of platinum as set forth in the foregoing Noble/Brower patent when added to the instant composition, in combination with the glass frits, retards rather than improves the flame insulativeness of the instant composition.

Room temperature vulcanizable silicone rubber compositions comprise a silanol end-stopped diorganopolysiloxane polymer having a viscosity anywhere from 1,000 to 200,000 centipoise at 25°C. Such silanol stopped linear diorganopolysiloxane polymers are well known in the art as set forth in the Lampe and Bessmer, U.S. patent 3,888,815. As pointed out in that patent, such linear silanol end-stopped diorganopolysiloxane polymers may be produced by various methods such as the equilibration of cyclicsoloxanes in the presence of a mild acid catalyst such as, sulfuric acid treated clay or toluene sulfonic acid with a proper amount of water in the composition or the equilibration of certain silicone hydrolyzates that are obtained by hydrolysis of diorganodichlorosilanes. Preferably, such silanol end-stopped diorganopolysiloxane polymer has the formula,

$$HO\left[\begin{matrix}R^4\\|\\SiO\\|\\R^4\end{matrix}\right]_b H$$

where R^4 is selected from alkyl radicals, aryl radicals, alkenyl radicals and fluorinated alkyl radicals of up to 10 carbon atoms, and b varies from 380 to 1000. The preparation of such silanol end-stopped diorganopolysiloxane polymers is more fully explained in the foregoing Bessmer and Lampe patent set forth above.

The organo groups of the linear silanol end-stopped diorganopolysiloxane polymer may be selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals. Accordingly, such organo groups may be selected from alkyl radicals of from 1 to 8 carbon atoms, alkenyl radicals, cycloalkyl radicals and mononuclear aryl radicals such as radicals being, for instance, methyl, ethyl, propyl, vinyl, allyl, cyclohexyl, phenyl, methylphenyl, ethylphenyl and etc. As examples of halogenated monovalent hydrocarbon radicals, such halogenated monovalent hydrocarbon radicals may be selected from various chlorinated and fluorinated alkyl radicals and more preferably may be such fluorinated alkyl radicals such as, 3,3,3-trifluoropropyl. However, more preferably, the organic groups are those as set forth in the paragraph above.

In addition to the silanol end-stopped diorganopolysiloxane polymer, such compositions would have the same amount of filler per 100 parts of such silanol end-stopped polymer, that is, from 50 to 300 parts by weight of an inert and more preferably from 100 to 250 parts by weight of inert filler. Such inert filler may be the same in concentration and definitions set forth for the heat vulcanizable silicone rubber composition. Again, such inert filler is preferably totally fumed silica or precipitated silica. There is generally present in the composition from 25 to 150 parts of ground glass and more preferably 50 to 100 parts of ground glass, such ground glass being the glass frits mentioned previously, having the glass transition temperature between 1,000 to 1,400°F. As explained previously, such ground glass, that is, ground glass known as glass frits, or known by some other name has a glass transition temperature between 1,000° and 1,400°F, and preferably an average particle size varying between 50 to 400 microns. The same limitations in quantity and type of the ground glass specified above for the heat vulcanizable silicone rubber composition applies also to room temperature vulcanizable silicone rubber compositions. Such two-part room temperature vulcanizable silicone rubber compositions are preferably stored with the one-part containing the linear silanol end-stopped diorganopolysiloxane and an inert filler, the second part comprising 1 to 15 parts per 100 parts of the linear silanol polymer of silicate having the formula,

$$R^1_aSi(OR^2)_{4-a}$$

and partial hydrolysis products thereof where R^1 and R^2 are selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals and a is 0 or 1, again the R^1 and R^2 radicals may be any of the radicals set forth previously for the organo substituting groups for the linear diorganopolysiloxane polymer or silanol end-stopped polymer. Preferably the radicals are selected from alkyl radicals, alkenyl radicals, aryl radicals and fluoroalkyl radicals of up to 10 carbon atoms.

More preferably, the silicate is a partial hydrolysis product of the compound set forth in the formula above. For more information as to the preparation and use of such silicate in two-part room temperature vulcanizable silicone rubber compositions one can refer to the Lampe and Bessmer patent. Accordingly, in the second part of such two-part room temperature vulcanizable silicone rubber compositions along with the silicate there is preferably present .01 to 5 parts by weight of a metal salt of carboxylic acid varying from lead to manganese in the periodic table. Although the metal salt is preferably of a monocarboxylic acid, both metal salts of monocarboxylic acid and dicarboxylic acids can be utilised is the room temperature vulcanizable silicone rubber composition of the instant case. The most preferred metal salts that may be utilized as catalysts with the compositions of the instant case within the room temperature vulcanizable silicone rubber compositions in the instant case are tin salts and specifically dibutyl tin dilaurate. Other ingredients that may be added to the compositions, as is necessary, are pigments and the other usual ingredients as disclosed in the foregoing Lampe and Bessmer patent for the purpose of meeting the requirements of a particular electrical system. To cure the two-part room temperature vulcanizable silicone rubber composition of the instant case, the first part is mixed with the second part and the material is molded or formed into the desired shape or injected into desired cavities to be insulated and allowed to cure at room temperature—final curing taking place in 24 hours. Again to obtain maximum flame insulative properties in the two-part room temperature vulcanizable silicone rubber composition there may be present from 5 to 50 parts by weight of glass fibers and more preferably 5 to 30 parts by weight of glass fibers, and more specifically, milled glass fibers having an average length ranging from 0.01 to 0.5 inches in length; the preferred range of the milled glass fibers having the size of 0.1 to 0.3 inches in length. Glass fibers outside the above ranges and size may be utilized. Generally, it has been found that no additional benefits have been gained by exceeding the 50 parts by weight and if there is less than 5 parts by weight of glass fibers, the glass fibers do not add any flame insulative properties to the composition. As specified previously, within the broad range for the addition of glass frits to the two-part room temperature vulcanizable silicone rubber composition, as in the case of the heat vulcanizable silicone rubber composition there is preferably added 50 to 100 parts of glass frits, preferably such glass frits having a size average particle size ranging from 50 to 400 microns in size. Finally, as with the heat vulcanizable silicone rubber composition, for certain additional flame insulative properties there may be added to the instant composition 5 to 30 parts of carbon black. Preferably, it must be pointed out, as stated previously, although the above particle size has been given for the glass frits or ground glass both in the heat vulcanizable silicone rubber composition and the room temperature vulcanizable silicone rubber composition, such ranges are general guides. The only requirement in the use of the ground glass is that the particle size is up to 400 microns and ground glass has glass transition temperatures between 1,000 to 1,400°F.

It can be appreciated that the amount of the flame insulative additives that will be utilised in a specific composition will be the values that give a particular flame insulativeness or a structured silicone ash for a particular application. In addition, the uses of milled glass fibers are optional and would only be necessary to obtain maximum flame insulativeness for the insulation and protection of certain electrical systems. This is the case with the addition of the carbon black which has been found necessary in certain applications. However, again with respect to the concentrations of such carbon black and glass fibers the concentrations given in the instant application are given as guides and the particular concentrations for a specific application to protect a particular system would be determined by the flame insulative properties desired for that particular electrical system. The critical aspect of the instant invention lies in the utilization of ground glass, at the concentration set forth above to produce a heat or room temperature vulcanizable silicone rubber system which will protect and impart the desirable flame insulativeness to an electrical system so that as a result when the silicone system burns it will form a structured white ash which provides protection to the electrical system. To improve such properties it is also disclosed in the instant case that glass fibers in certain generally preferred quantities may be added as well as the additional use of carbon black.

Examples are given for the purpose of illustrating the conception and reduction to practice of the instant invention. All parts are by weight.

EXAMPLE 1 to 4

There was prepared various two-part room temperature vulcanizable silicone rubber compositions having the ingredients set forth in the Table below having the amount of the ingredients as set forth in the Table below, such systems comprising 100 parts of a terminated dimethylpolysiloxane polymer of 2000—3000 centipoise and which contained 285 parts of 10 micron ground silica and 15 parts of titanium oxide which shall be known hereinafter as Mixture "A". There was also prepared a mixture comprising 100 parts of a silanol end-stopped dimethylpolysiloxane polymer of 30,000 centipoise viscosity at 25°C, which contained 326 parts of ground quartz, 6 parts of ethyorthosilicate, 0.6 parts of dibutyl tin dilaurate and green pigment, which shall be known as Mixture "B" in the Table. There was prepared a mixture referred to in the Table below as Mixture "C" comprising 100 parts of a silanol-terminated dimethylpolysiloxane of 3000 centipoise at 25°C, 326 parts of ground quartz, 18 parts of partially hydrolyzed ethylorthosilicate, 1.7 parts of dibutyl tin dilaurate. These two-part room temperature vulcanizable silicone rubber compositions were mixed in the amount of glass frits shown in the Table (all parts being by weight). In every case the products of the Table were evaluated after the composition was finally cured by placing them in a muffle furnace, heating them to 1400°F, allowing the mass to cool to room temperature, and visibly inspecting the ash. In every case the ash was highly structured.

TABLE

Example No:	1	2	3	4
Mixture A	50	50	80	80
Mixture B	50	50	—	—
Mixture C	—	—	20	20
Glass Frits	5	10	5	7.5

WHAT WE CLAIM IS:—

1. A flame insulative room temperature vulcanizable silicone rubber composition comprising (a) 100 parts by weight of silanol end-stopped diorganopolysiloxane having a viscosity varying from 1000 to 200,000 centipoise viscosity at 25°C; (b) from 25 to 150 parts by weight of ground glass having a size of up to 400 microns and a glass transition temperature of between 1000 and 1400°F; (c) from 50 to 300 parts by weight of an inert filler different from the ground glass of (b); and (d) from 1 to 15 parts by weight of a silicate having the formula,

$$R^1_aSi(OR^2)_{4-a}$$

and partial hydrolysis products thereof, where R^1 and R^2 are selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, a is 0 or 1, and (e) from 0.01 to 5 parts by weight of the metal salt of a carboxylic acid the metal varying from lead to manganese in the periodic table.

2. A composition as claimed in claim 1 wherein the silanol end-stopped diorganopolysiloxane has the formula,

$$HO\left[\begin{matrix}R^4\\ |\\ SiO\\ |\\ R^4\end{matrix}\right]_b H$$

where R^4 is selected from alkyl radicals, aryl radicals, alkenyl radicals and fluorinated alkyl radicals of up to 10 carbon atoms and b varies from 380 to 2,000.

3. A composition as claimed in any one of the preceding claims wherein there is further present from 5 to 50 parts by weight of glass fibres.

4. A composition as claimed in claim 3 wherein said glass fibres are present at a concentration of 5 to 30 parts by weight and are milled glass fibres having an average size varying from 0.01 to 0.5 inches.

5. A composition as claimed in claim 4 wherein said ground glass is glass frits having a size varying from 50 microns to 400 microns.

6. A composition as claimed in claim 5 wherein the amount of said glass frits varies from 50 to 100 parts by weight.

7. A composition as claimed in any one of the preceding claims wherein there is present from 5 to 30 parts of carbon black.

8. A composition as claimed in any one of the preceding claims wherein (c) is selected from ground silica, fumed and precipitated silica.

9. A process for forming a flame insulative room temperature vulcanizable silicone rubber composition comprising mixing at room temperature in the presence of ambient moisture (a) 100 parts by weight of a silanol end-stopped diorganopolysiloxane having a viscosity varying from 1,000 to 20,000 centipose at 25°C, where the organo groups are selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals; (b) from 25 to 150 parts by weight of ground glass having a size of up to 400 microns and a glass transition temperatuge of between 1000 and 1400°F; (c) from 50 to 300 parts by weight of an inert filler different from the ground glass of (b); and (d) from 1 to 15 parts by weight of a silicate having the formula,

$$R^1_a Si(OR^2)_{4-a}$$

and partial hydrolysis products thereof where R^1 and R^2 are selected from monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals, a is 0 or 1 and (e) from 0.01 to 8 parts by weight of the metal salt of a carboxylic acid the metal varying from lead to manganese in the periodic table.

10. A flame insulative room temperature vulcanizable silicone rubber composition as claimed in claim 1 substantially as described in any one of the Examples.

11. A process for forming a room temperature vulcanizable silicone rubber composition as claimed in claim 9

substantially as described in any one of the Examples.

12. A flame insulative room temperature vulcanizable silicone rubber composition when produced by a process as claimed in claim 9 or claim 11.

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Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1980
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.