container hindering the passage of the sealant composition out of the container, or in passing through the tire valve, into the tire so that a smooth puncture sealing operation cannot be carried out. The disclosure in WO 2007/112010 attempts to manage this problem by incorporating glycerine, or glycerine and potassium acetate, as anti-freeze agents in place of ethylene glycol or propylene glycol, optionally with surfactants. While glycerine is said to be less easily mixed with latex than ethylene glycol, in combination with a surfactant mixing procedure it is said to suppress the upward migration activity of latex particles and their accumulation near the surface of the composition.

SUMMARY

[0010] In one aspect, the present invention refers to a sealant composition comprising a liquid carrier comprising one or more components selected from water, a glycol and glycerine; latex in an amount between 0.5 to 6.0% by weight of the composition; a polysaccharide suspending agent selected from one or more of diutan gum, grewia gum and microfibrous cellulose; and a particulate material with a particle size of less than 300 µm. In another aspect, the present invention refers to a method of formulating a sealant composition including the steps of (a) preparing a concentrate pre-mix by combining two or more of glycerine, propylene glycol and water and adding a particulate material with a particle size of less than 300 µm and a surfactant;

(b) preparing a rosin pre-mix by combining a liquid carrier with gum rosin; (c) adding a polysaccharide suspending agent selected from one or more of diutan gum, grewia gum and microfibrous cellulose to a liquid carrier and subsequently combining in the concentrate pre-mix, the rosin pre-mix and latex in an amount between 0.5 to 6.0 % by weight of the composition, with mixing, to thereby formulate the sealant composition. In yet another aspect, the present invention refers to a method of sealing a puncture in a pneumatic tire including the step of exposing the puncture to a sealant composition comprising a liquid carrier, latex in an amount between 0.5 to 6.0 % by weight of the composition, a polysaccharide suspending agent and a particulate material with a particle size of less than 300 µm, wherein the liquid carrier comprises one or more components selected from water, a glycol and

glycerine and wherein the polysaccharide suspending agent is selected from one or more of diutan gum, grewia gum and microfibrous cellulose, to thereby seal the puncture. The present invention is predicated, at least in part, on the surprising finding that it is possible to reliably and responsibly seal punctures that meet with original equipment manufacturers' (car manufacturers) sealing requirements while substantially reducing the level of latex typically used in the industry. Advantageously, this reduction results in better acceptance in tire repair shops due to reduced ammonia stench, less messy clean up and reduced environmental impact.

[0011] The present sealing compositions therefore strike a balance such that many of the benefits of latex can be exploited but the previously exhibited draw backs are reduced. The sealing compositions therefore allow for optimal flow characteristics within the tire chamber by control of viscosity thereby improving the sealing of outer shoulder edge and sidewall punctures while at the same time controlling the aggregation of the latex solid particles with a suspending agent to thereby provide for increased stability and storage lifetime and reduced likelihood of blockage of dispensing equipment and the valve core.

[0012] The compositions further provide for the use of particulate material of a certain size which, in concert with the latex, will provide for

CLAIMS

1. A sealant composition comprising a liquid carrier comprising one or more components selected from water, a glycol and glycerine; latex in an amount between 0.5 to 6.0% by weight of the composition; a polysaccharide suspending agent selected from one or more of diutan gum, grewia gum and microfibrous cellulose; and a particulate material with a particle size of less than 300 µm.

2. The sealant composition of claim 1 wherein the liquid carrier comprises between 20% to 80% by weight water, 5% to 50% by weight glycerin and 5% to 50% by weight propylene glycol.

3. The sealant composition of claim 1 or claim 2 wherein the latex is a natural or synthetic rubber latex emulsion or dispersion.

4. The sealant composition of any one of the preceding claims wherein the polysaccharide suspending agent is present in an amount of between 0.0025% to 1.0% by weight of the total composition.

5. The sealant composition of any one of the preceding claims wherein the particulate material has a maximum particle size ranging from 10 µm to 250 µm.

6. The sealant composition of any one of the preceding claims wherein the particulate material comprises a distribution of particle sizes of (i) 0.5% to 5% from 10 µm to 38 µm; (ii) 4% to 12% from 38 µm to 75 µm; (iii) 35% to 60% from 75 µm to 150 µm; (iv) 20% to 45% from 150 µm to 200 µm; and (v) 5% to 18% from 200 µm to 250 µm.

7. The sealant composition of any one of the preceding claims wherein the particulate material is selected from one or more of synthetic polymers, plant polymers and clays.

8. The sealant composition of claim 7 wherein the particulate material is selected from one or more of polyethylene, polypropylene, pulverised bark powder, pulverised peanut shells, chitosan, Equisetum

Arvense powder, tea powder, parsley powder, diatomite, bentonite and titanium dioxide.

9. The sealant composition of any one of the preceding claims wherein the sealant composition has a total solids content of between 3% to 6%, by weight of the total composition.

10. The sealant composition of any one of the preceding claims further comprising a component selected from the group consisting of fumed silica, tapioca, ammonia, gum rosin, sodium silicate, sodium bicarbonate, vinyl resin and polybutane and combinations thereof.

11. The sealant composition of any one of the preceding claims wherein the sealant composition comprises a viscosity selected from between 30 to 100 cP.

12. The sealant composition of any one of the preceding claims wherein the pH of the sealant composition is between 9.0 to 10.0.

13. A method of formulating a sealant composition including the steps of:

(a) preparing a concentrate pre-mix by combining two or more of glycerine, propylene glycol and water and adding a particulate material with a particle size of less than 300 µm and a surfactant;

(b) preparing a rosin pre-mix by combining a liquid carrier with gum rosin;

(c) adding a polysaccharide suspending agent selected from one or more of diutan gum, grewia gum and microfibrous cellulose to a liquid carrier and subsequently combining in the concentrate pre-mix, the rosin pre-mix and latex in an amount between 0.5 to 6.0 % by weight of the composition, with mixing,

to thereby formulate the sealant composition.

14. The method of claim 13 wherein the concentrate pre-mix comprises glycerine, propylene glycol and water.

15. The method of claim 13 or claim 14 wherein the preparation of the concentrate pre-mix includes the further addition of one or more of fumed silica, tapioca, bentonite, polybutane, and sodium silicate.

16. The method of any one of claim 13 to claim 15 wherein the rosin pre-mix is prepared by combining propylene glycol with gum rosin with agitation.

17. A method of sealing a puncture in a pneumatic tire including the step of exposing the puncture to a sealant composition comprising a liquid carrier, latex in an amount between 0.5 to 6.0 % by weight of the composition, a polysaccharide suspending agent and a particulate material with a particle size of less than 300 µm, wherein the liquid carrier comprises one or more components selected from water, a glycol and glycerine and wherein the polysaccharide suspending agent is selected from one or more of diutan gum, grewia gum and microfibrous cellulose, to thereby seal the puncture.

18. The method of claim 17 wherein the puncture is in the outer shoulder edge and/or sidewall of the tire.

19. The method of claim 17 or claim 18 wherein exposure occurs by transfer of the sealant composition from a container through a valve of the pneumatic tire without removal of the valve core as a necessity.

20. The method of any one of claim 17 to claim 19 wherein the sealing is a temporary sealing which begins to diminish after a certain distance travelled by the tire.

21. The method of any one of claim 17 to claim 20 wherein the sealant composition is as defined in any one of claim 1 to claim 12.