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(54) Titre : COMPOSITION ANTICREVAISON A BASE D'EAU POUR PNEUMATIQUE ET CHARGE DE GONFLEMENT  
(54) Title: WATER-BASED TIRE SEALANT AND INFLATOR COMPOSITION

(57) **Abrégé/Abstract:**

A water-based tire sealant and inflator composition in which the sealant comprises an acrylic resin. In preferred embodiments, the water-based tire sealant and inflator composition comprises an acrylic resin, an alkyl acetate solvent, a surfactant, additives selected from extenders and thixotropic clays, and mixtures thereof, and a propellant selected from a hydrofluorocarbon and a perfluorocarbon. The composition is in the form of a dispersion.



**ABSTRACT OF THE DISCLOSURE**

A water-based tire sealant and inflator composition in which the sealant comprises an acrylic resin. In preferred embodiments, the water-  
5 based tire sealant and inflator composition comprises an acrylic resin, an alkyl acetate solvent, a surfactant, additives selected from extenders and thixotropic clays, and mixtures thereof, and a propellant selected from a hydrofluorocarbon and a perfluorocarbon. The composition is in the form of a dispersion.

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**TITLE:****WATER-BASED TIRE SEALANT AND INFLATOR COMPOSITION**

5           The present invention relates to a water-based, essentially non-  
flammable tire sealant and inflator composition. In particular, the invention  
relates to a water-based tire sealant and inflator composition having a sealant  
that is an acrylic resin, and which has a propellant that is a hydrofluorocarbon  
(HFC) or perfluorocarbon propellant. The composition is intended for use in  
10       sealing and inflating pneumatic tires in the event that the tire is punctured.

          Portable aerosol containers of tire sealant compositions and propellant  
are well known for use in an emergency to inflate and temporarily seal a  
pneumatic tire that has a puncture, when a service station or other repair  
facility is not immediately available to the motorist. The compositions are  
15       particularly intended to be used on automobile tires. The use of the tire  
sealant composition will often allow the motorist to drive the vehicle to a  
convenient location, especially a service station, where the punctured tire can  
be inspected and repaired. The use of the portable aerosol container  
containing the tire sealant and inflator composition is intended to obviate the  
20       need for a motorist to remove the punctured tire from the automobile and  
replace it with a spare tire in order to reach the service station. It could also  
eliminate the inconvenience and danger of being stranded on the road with a  
punctured tire if the motorist either does not have a spare tire or is physically  
unable to replace the punctured tire with a spare tire.

25           In typical examples of commercially available tire sealant and inflator  
compositions, the composition including propellant is in a so-called aerosol  
container (can) and it is introduced from the container directly into the interior  
cavity of the pneumatic tire. One method utilizes a length of flexible tubing  
that is connected from the valve stem of the container to the valve on the tire.  
30       The tire sealant and inflator composition is carried into the tire by the  
propellant on activation (depression) of the valve stem on the container. A

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second method utilizes a 1.5 inch (3.5 cm) rigid plastic stem adapter instead of a flexible hose assembly. The adapter fits on the valve housing of the aerosol container and is designed to open both the container valve and the tire valve when firmly seated on a tire valve stem.

5           Traditionally, tire sealing and inflator compositions have been solvent-based compositions. Hydrocarbons or chlorofluorocarbons were used as propellants and inflators. However, most hydrocarbon propellants are flammable, and consequently there are potential risks associated with the use of hydrocarbons as inflators, including fire hazards in a service station when a  
10           tire is removed for repair. In contrast, chlorofluorocarbons (CFCs) are non-flammable and have been used widely for refrigerants, in air conditioners, as aerosol propellants and as blowing agents in the manufacture of foam insulation. CFCs are generally viewed as being non-toxic, non-flammable and safe to use in proximity to humans, but are now known to have harmful  
15           effects on the ozone layer in the atmosphere. For this reason, efforts have been made internationally, including the Montreal protocol, to protect the ozone layer by limiting the amount of CFCs released into the atmosphere.

            Subsequently, hydrochlorofluorocarbons (HCFCs) were developed as propellants for the above uses, including use as the propellant in solvent-  
20           based tire inflator compositions. Chlorodifluoromethane i.e. hydrochlorofluorocarbon 22 (HCFC 22), became a preferred propellant because it does not have a flash point and is non-flammable. HCFCs have substantially less detrimental effect than CFCs on the ozone layers of the atmosphere, but there is a need for further reductions in the effects of  
25           propellants on the ozone layer.

            Alternatives to HCFCs and CFCs as propellants are hydrofluorocarbons and perfluorocarbons. Some examples of these are: 1,1,1,2,3,3,3-heptafluoropropane or HFC 227ea, trifluoromethane or HFC 23, difluoromethane or HFC 32, pentafluoroethane or HFC 125, 1,1,1,2-tetra-  
30           fluoroethane or HFC 134a, 1,1-difluoroethane or HFC 152a, perfluoropropane and perfluorobutane. These compounds could be used alone or in blend

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combinations. Some of these compounds blend to form azeotropic mixtures, where the vapour pressure of the blend is either above or below that of the pure components. As an example, HFC 152a is flammable, but it is known that blends of HFC 152a and HFC 227ea may be prepared that are non-  
5 flammable and have vapour pressures that are within regulatory specifications for pressures for aerosol containers at the prescribed temperature limits.

Water-based tire sealant compositions are also known. For instance, U.S. 3 860 539 describes a tire lining agent to render an automobile tire  
10 puncture proof. The lining agent is an adhesive consisting of an aqueous dispersion of polyvinyl acetate, polyacrylic acid ester, butadiene-acrylonitrile rubber or a polychloroprene, and finely divided rubber particles. No propellant is used.

U.S. 5 124 395 describes a water-based tire sealant and inflator  
15 composition in which the sealant is a latex or polyvinyl acetate emulsion and a preferred propellant for the composition is 1,1,1,2-tetrafluoroethane (hydrofluorocarbon 134a). The preferred vapour pressure depressant used in the composition is butyl cellosolve (2-butoxyethanol) which forms a homogeneous sealant and inflator composition. U.S. 3 843 586 describes an  
20 aqueous composition in which the sealant comprises polyisoprene latex and the propellant is a liquid gas. U.S. 4 501 825 describes a tire sealant and inflator composition comprising resin and a latex. Examples of the resin include phenolic resins and glycerol esters of hydrogenated wood rosins and examples of the latex include polymers and copolymers of isoprene, styrene  
25 and butadiene.

Further water-based tire sealant and inflator compositions that have less potential impact on the environment than solvent-based compositions would be useful, and such a composition has now been found.

Accordingly, one aspect of the present invention provides a water-  
30 based tire sealant and inflator composition in which the sealant comprises an acrylic resin.

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In a preferred embodiment of the composition, the composition further comprises a propellant selected from a hydrofluorocarbon and a perfluorocarbon.

5 A further aspect of the present invention provides a water-based tire sealant and inflator composition comprising:

- a) an acrylic resin;
- b) an alkyl acetate solvent; and
- c) water,

said composition forming a two-phase liquid system.

10 In a preferred embodiment of the present invention, the two-phase liquid system is an emulsion with aqueous and organic phases.

Another aspect of the present invention provides a water-based tire sealant and inflator composition comprising:

- a) an acrylic resin;
- 15 b) an alkyl acetate solvent;
- c) a surfactant;
- d) additives selected from extenders and thixotropic clays, and

mixtures thereof; and

- e) a propellant selected from a hydrofluorocarbon and a
- 20 perfluorocarbon,

said composition being in the form of a dispersion or an emulsion.

The tire sealant and inflator composition of the present invention is a water-based composition, and thus is understood to contain water in addition to being comprised of propellant and sealant. The sealant is an acrylic resin.

25 The propellant is a hydrofluorocarbon (HFC) or perfluorocarbon, and does not include gaseous chlorofluorocarbons (CFCs) or hydrochlorofluorocarbons (HCFCs). The latter contain chlorine, and are not friendly to the environment. The composition is a two-phase composition, essentially a two-phase liquid/liquid composition in which the acrylic resin is in solution, as discussed

30 herein, and it is important that the acrylic resin does not precipitate within the aerosol container and render the aerosol container inoperative for dispensing

of the water-based tire sealant and inflator composition.

Hydrofluorocarbon and perfluorocarbon compounds and mixtures that are useful for the purposes of this invention are compounds and mixtures that exhibit a vapour pressure at temperatures down to  $-15^{\circ}\text{C}$ , or slightly lower, that is capable of expelling the contents of the aerosol container into a tire. Additionally, the vapour pressure in the container should not exceed 1245 kPa (gauge pressure) at  $55^{\circ}\text{C}$ , i.e. 180 psig at  $130^{\circ}\text{F}$ , which is the regulatory limit for commonly available DOT specification 2Q or TC specification 2Q containers; DOT is the Department of Transportation (United States), and TC is Transport Canada.

The 2Q specification is an aerosol container manufacturing specification, as is known, and it describes the metal and seam requirements for three-piece tinplate aerosol containers used with high pressure products. The pressure in an aerosol container increases as the temperature rises, and a 2Q specification container is designed to withstand 1245 kPa (gauge) or 180 PSIG without deforming; this type of container is designed so that it will not burst until the pressure in the container is above 1870 kPa (gauge). Formulations used with this container specification should not exceed 1245 kPa (gauge) pressure at  $55^{\circ}\text{C}$ .

The acrylic resin may be an acrylic acid polymer, an acrylic acid copolymer, a methacrylic acid polymer or a methacrylic acid copolymer, or a polymer or copolymer of ester derivatives thereof e.g. butyl methacrylate acrylic resin. Preferred acrylic resins are copolymers, especially copolymer resins formed from acrylate monomers. Examples of such monomers are methyl methacrylate, ethyl methacrylate, n-butyl methacrylate and isobutyl methacrylate. It will be appreciated that lower molecular weight polymers are easier to dissolve than higher molecular weight polymers with the same backbone in the polymer. Lower molecular polymers have lower solution viscosity, higher solids content in solutions of the same viscosity and faster solvent release. In contrast, higher molecular weight polymers have increased strength and greater abrasion resistance. Changing the monomer

ratio in the polymers affects resistance to solvent attack, tack or stickiness of the resin film, hardness and flexibility.

Examples of acrylic resins include Elvacite™ 2013 low molecular weight methyl/n-butyl methacrylate copolymer, Elvacite™ 2028 low molecular weight  
5 methacrylate copolymer, Elvacite™ 2042 very high molecular weight ethyl methacrylate polymer, Elvacite™ 2043 low molecular weight ethyl methacrylate polymer, Elvacite™ 2044 high molecular weight n-butyl methacrylate polymer, Elvacite™ 2045 high molecular weight isobutyl methacrylate polymer and Elvacite™ 2046 high molecular weight n-butyl/isobutyl methacrylate (50150) copolymer, all of  
10 which are available from ICI Acrylics, Neocryl™ B700 medium molecular weight butyl methacrylate polymer, Neocryl™ B705 high molecular weight butyl methacrylate copolymer, Neocryl™ B725 low to medium molecular weight methyl methacrylate/butyl methacrylate copolymer and Neocryl™ B814 acrylic acid terpolymer from Zeneca Resins, and Paraloid™ B-66 methyl methacrylate/butyl  
15 methacrylate copolymer, Paraloid™ B-67 isobutyl methacrylate polymer, Paraloid™ B-72 ethylmethacrylate copolymer and Paraloid™ DM-55 methyl methacrylate copolymer from Rohm & Haas. The molecular weights, where indicated, were provided in the literature from the supplier.

The addition of organic solvent, propellant and surfactant to the acrylic resin  
20 all are understood to assist in forming a two-phase system of the water-based tire sealant and inflator composition within the aerosol container.

The preferred organic solvent is an alkyl acetate, of the formula  $\text{ROCOCH}_3$ , in which R is an alkyl group having 6-13 carbon atoms. Such alkyl acetates are available as Exxate™ solvents under the trade designations 600 to 1300.  
25 Preferably, the organic solvent alone will dissolve the acrylic resin, as well as exhibit an acceptable combination of evaporation rate and high flash point. The solvents used in the tire sealant and inflator compositions of the invention are not miscible or have very low miscibility with water. Solvents such as butyl cellosolve that are completely miscible with water cause precipitation of acrylic resin when mixtures of  
30 the resin and butyl cellosolve

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are mixed with water. Use of solvents that are partially miscible results in compositions that are susceptible to destabilization and consequent precipitation of resin on addition of water.

5 The propellant is the hydrofluorocarbon or perfluorocarbon described above.

10 The preferred compositions of the invention contain a surfactant that has an affinity for both the aqueous phase and the organic phase of the composition. The properties of a surfactant may be defined using a rating system developed by Imperial Chemical Industries and which is known as the Hydrophile-Lipophile Balance Scale, which gives an HLB number for surfactants. Surfactants with similar HLB numbers tend to give similar emulsification properties. The use of HLB numbers is known. A particular HLB number may be obtained using a single surfactant or combinations of surfactants. The HLB scale runs from 0 (Lipophilic) to 20 (Hydrophilic). The surfactants used in the composition of the present invention should have an HLB value in the range of about 11.0 to 16.0, with preferred surfactants having an HLB of about 12.5 to 14.5. Preferred surfactants are ethoxylated alkylphenols, examples of which are octylphenoxypolyethoxyethanol and nonylphenoxypolyethoxyethanol. A variety of such surfactants are available. 20 For instance, examples of surfactants classified as octylphenoxypolyethoxyethanol include Delonic OPE-10 from Deforest Enterprises Inc., Makon OP-9 from Stepan Company, T-Det O-9 from Harcros Chemicals Inc. and Triton X-102 from Union Carbide Corp. Examples of surfactants classified as nonylphenoxypolyethoxyethanol include Armul 912 25 from Witco Corp., Atlas EMJ-2 from Atlas Refinery Inc., Delonic NPE-10 from Deforest Enterprises Inc. and Triton N-101 from Union Carbide Corp.

30 The preferred composition of the invention also contains extenders and a thixotropic clay. In particular, the composition has a large particle size extender, a small particle size extender, and a thixotropic clay to increase viscosity. The large particle extender has a particle size that is small enough to pass through the aerosol valve. Its purpose is to form an initial porous seal

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of the puncture in the tire, with the small particle extender clay filling in the pores between the large particle extender particles. This enables the acrylic resin to seal the particles together, and seal the puncture. The small particle size extender is also believed to act as a thixotrope.

5           The thixotropic clay increases low shear rate viscosity of the composition. This slows fluid seepage out of the relatively small holes in the tire puncture while the puncture is being sealed, as the fluid is under low shear in the puncture hole. At high shear rates e.g. when the sealant is being sprayed out of the can, the viscosity is low and the sealant sprays out quickly.  
10 This allows for rapid dispensing from the aerosol can. The thixotropic clay is also believed to assist in maintaining a uniform composition in the can. The specific gravity difference between the aqueous and organic phases is small and phases of the composition do not rapidly separate after shaking. The result is that the composition sprays out of the can as a substantially uniform  
15 composition.

          The thixotropic clay extender is less effective in raising the viscosity of the mixture in the aerosol can than after spraying into the tire. The volume of liquid propellant is about 23% of the volume of the can contents, and this dilutes the thixotropic extender, making it less effective in the aerosol can.  
20 However, after the composition is sprayed into the tire, the propellant becomes a gas and the effectiveness of the thixotropic extender increases. Low shear viscosity rises. Thus, the composition has a low viscosity going through the aerosol valve and into the tire to promote rapid filling of the tire. However, the sealant viscosity is higher when the sealant is passing through  
25 a hole in the tire, leading to slower seepage rates and providing the sealant with time to set up and seal the puncture.

          Tire inflator and sealant compositions should not be flammable because of the hazards associated with the subsequent repair of a tire, as discussed above. The standard test to determine the flammability is to test  
30 the flash point of a mixture. There are several ASTM test methods for determining flash points, with the Setaflash test method being appropriate for

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highly pigmented liquid samples. The Setaflash Closed-Cup Apparatus test method for the measurement of flash point is "Standard Test Method for Flash Point of Liquids by Setaflash Closed-Cup Apparatus, ASTM D-3278".

5 The flash point of a tire sealant and inflator concentrate of a type similar to those described in Example III hereafter was 102°C using the Setaflash test method.

10 The tire sealant and inflator compositions of the invention are in the form of an emulsion or a dispersion, with resin dissolved in a phase that is dispersed as droplets in an aqueous phase. The compositions are not in the form of a latex, which is a solid dispersed in water.

15 In embodiments of the invention, the compositions comprise 3-13% by weight of acrylic resin, especially 4-10% by weight; 6-30% by weight of alkyl acetate solvent, especially 10-22% by weight; 14-45% by weight of water, especially 22-40% by weight; 15-45% by weight of propellant, especially 20-35% by weight; 0.3-4.5% by weight of surfactant, especially 1-3% by weight; 3-20% by weight of extenders, especially 7-15% by weight and 0-8% by weight of thixotropic clays, especially 1-4% by weight.

20 The compositions of the invention are particularly intended for use as tire sealant and inflator compositions, especially for emergency use to inflate and temporarily seal a pneumatic tire that has a puncture. The compositions would be stored in an aerosol container and typically placed in the trunk of an automobile for use when required.

The present invention is illustrated by the following examples.

25

### EXAMPLE I

A series of tests were conducted to determine the effects of propellant and alkyl acetate solvent on acrylic resins.

30 The first test was to determine the effect of propellant alone on acrylic resin. Fifteen (15) grams of various solid acrylic resins were poured into different Wheaton aerosol glass compatibility bottles. The bottles were crimped, and charged with 67.5 grams of HFC 134a.

The second test was to determine the effect of alkyl acetate solvent, by dissolving 20.5 grams resin in 50 grams Exxate™ 700 alkyl acetate i.e.  $C_7H_{16}OCOCH_3$ , using the same type of bottles.

The third test was to determine the effect of both alkyl acetate and propellant.  
 5 10 grams of resin and 24.4 grams of Exxate™ 700 alkyl acetate were placed in Wheaton aerosol glass compatibility bottles, which were crimped and charged with 32.9 grams HFC 134a.

The results obtained are given in Table I.

**TABLE I**

10

<b>Solubility of Acrylic Resins</b>			
<b>Resin</b>	<b>Exxate 700 solvent</b>	<b>HCFC 134a propellant</b>	<b>Exxate 700 solvent/HFC 134a propellant</b>
Elvacite™ 2013	Bottom gel	Plasticized	Dissolved
Elvacite™ 2028	Dissolved	Plasticized	Dissolved
Elvacite™ 2042	High visc. Syrup	Plasticized	Bottom layer thick mass
Elvacite™ 2043	Bottom gel	Plasticized	Dissolved
Elvacite™ 2044	Dissolved	Plasticized	Dissolved
Elvacite™ 2045	Dissolved	Plasticized	Dissolved
Elvacite™ 2046	Dissolved	Plasticized	Dissolved
Neocryl™ B700	Dissolved	Plasticized	Dissolved
Neocryl™ B705	Dissolved	Plasticized	Dissolved
Neocryl™ B725	Dissolved	Plasticized	Dissolved
Neocryl™ B814	Dissolved	"A"	Dissolved
Paraloid™ B-66	Dissolved	Plasticized	Dissolved
Paraloid™ B-67	Dissolved	"B"	Dissolved
Paraloid™ B-72	Dissolved	"C"	Dissolved
Paraloid™ DM-55	Dissolved	Plasticized	Dissolved

\* Exxate™ 700 alkyl acetate solvent is  $C_7H_{16}OCOCH_3$ ;

A = when shaken hard, the resin broke into small pieces that dispersed in the  
 15 propellant liquid;

B = the resin formed a floating second phase over the propellant, which on shaking formed a translucent phase that slowly separated;

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C = the resin formed a second layer of very low viscosity, which on shaking formed a translucent phase that slowly separated;

5 These tests shows that there were differences between various commercially available acrylic Resins. All resins tested were plasticized by the propellant alone. Plasticized means that the resin beads or granules fused together under the effect of the propellant, and floated to the surface of the propellant, forming a clear, solid plug that covered the surface of the liquid.

10 Some of the resins did not dissolve in the Exxate 700 solvent alone. Only one acrylic resin did not dissolve completely in the combination of HFC 134a and Exxate 700 solvent.

15 The test showed that acrylic resins are useful in the formulation of the sealant and propellant compositions, in which both solvent and propellant are used.

### EXAMPLE II

20 A series of acrylic resins were formulated into water-based tire sealant and inflator compositions. Details of the compositions are given in Table II in the order of addition of the components.

Each of the compositions was charged to an aerosol glass compatibility bottle, which were then charged with HFC 134a. The resultant compositions had 27% by weight of the propellant.

25

### TABLE II

#### Freeze/Thaw Stability Testing

	<b>% by Weight</b>
Acrylic Resin*	8.20
Exxate™ 700 solvent	20.00
Santicizer™ S-160 plasticizer	0.70
Triton™ X-100 surfactant	2.50

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Propylene Glycol	4.00
Attigel™ 50 clay	2.00
De-ionized Water	32.00
Sodium Nitrate	1.00
Talc	11.20
Z-light Extender	3.70
Morpholine	0.70
De-ionized Water	14.00

Note: Z-light extender spheres are formed from silica-alumina ceramics.

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The acrylic resins tested were as follows:

Neocryl™ B705	Neocryl B700
Neocryl B725	Neocryl B802
Elvacite™ 2028	Neocryl B814
Elvacite 2044	Paraloid™ DM-55
Elvacite 2045	Paraloid B-66
Elvacite 2046	Paraloid B-67
	Paraloid B72

The compositions and supplier of these resins has been identified above.

5 The compositions were subjected to freeze/thaw cycles, between 20° and -20°C.

It was found that all compositions successfully survived 40 freeze/thaw cycles.

10

### EXAMPLE III

The pressure limits for a 2Q can are 180 psig at 130°F (1245 Kpa gauge at 55°C). The vapour pressure of pure HFC 134a exceeds the limit at 130°F (55°C).

15 A tire sealant and inflator composition as shown in Table III (in the order of addition of components) was prepared and charged into an aerosol glass compatibility bottle, to give 73% by weight of composition and 27% by weight of HFC 134a propellant.

20 The pressure in the aerosol glass compatibility bottle for each composition was tested at a series of temperatures. The pressure in an aerosol glass can compatibility bottle containing only HFC 134a propellant was also measured, for comparison.

The results are given in Table IV.

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**TABLE III**  
**Compositions**

	<b>% by Weight Composition A</b>	<b>% by Weight Composition B</b>
B72 Acrylic Resin	12.50	8.20
Exxate 700 alkyl acetate	30.00	20.00
Santicizer S-160 plasticizer	1.00	0.70
Triton X-100 surfactant	3.00	2.50
Propylene Glycol	3.00	4.00
Attagel 50 clay	5.00	2.00
D.I. Water	12.00	31.00
Sodium Nitrite	1.00	1.00
Talc	8.50	11.20
Z-Light Extender	2.80	3.70
Morpholine	1.00	0.70
De-ionized Water	20.20	15.00

5

**TABLE IV**

**Vapour Pressure of HFC 134a (psig)**

<b>Temp.</b>	<b>Composition A</b>	<b>Composition B</b>	<b>Propellant</b>
-9°F	1	---	1
25	18	25	22
70	47	56	71.2
100	78	88	124.3
110	90	106	146.5
120	105	122	171.3
135	118	147	213.6

10 It will be noted that the vapour pressure of HFC 134a exceeded the specification for pressure at 57°C (135°F), but that the formulations did not at the same temperature.

**EXAMPLE IV**

15 To determine effects of the particle size of the large particle extender, a series of large spherical particle extenders were added to alkyl acetate solvent to form a slurry in an aerosol can. A propellant (HFC-134a) was added. The aerosol can had a valve with a 0.30" opening.

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The contents of the cans were sprayed to determine the maximum particle size that could be sprayed through the valve. The information obtained was then used in the formulation of water-based tire sealant and inflator compositions as described herein, which were tested in the same  
5 manner.

In the test of the compositions, including tire sealant and inflator compositions, it was found that Z-light spheres grade G3400 (10 - 210 micron particle size) passed through the aerosol valve and through a hose adaptor and tire valve. However, Z-light spheres grade G3500 (10 - 350 micron  
10 particle size) plugged the aerosol can valve.

**CLAIMS:**

1. A water-based tire sealant and inflator composition in which the sealant comprises an acrylic resin dissolved in a solvent immiscible in water or with low water miscibility, a surfactant, and a propellant comprising one or more perfluorocarbons.
2. The water-based tire sealant and inflator composition of Claim 1 in which the propellant is a mixture of a hydrofluorocarbon and said one or more perfluorocarbons.
3. The water-based tire sealant and inflator composition of Claim 1 or Claim 2 in which the acrylic resin is an acrylic acid polymer, an acrylic acid co-polymer, a methacrylic acid polymer or a methacrylic acid co-polymer or a polymer or co-polymer of ester derivatives of acrylic acid or methacrylic acid.
4. The water-based tire sealant and inflator composition of Claim 3 in which the acrylic resin is selected from the group consisting of methyl/n-butyl methacrylate copolymer, methacrylate copolymer, ethyl methacrylate copolymer, n-butyl methacrylate copolymer, isobutyl methacrylate copolymer, n-butyl/isobutyl methacrylate copolymer, and ethyl methacrylate copolymer.
5. The water-based tire sealant and inflator composition of any one of Claims 1-4 in which the composition further comprises a propellant selected from 1,1,1,2,3,3,3-heptafluoropropane, trifluoromethane, difluoromethane, pentafluoroethane, 1,1,1,2-tetra-fluoroethane, 1,1-difluoroethane, perfluoropropane and perfluorobutane, and mixtures thereof.
6. The water-based tire sealant and inflator composition of any one of Claims 1-5 in which the composition comprises 3-13% by weight of acrylic resin, 15-45% by weight of propellant and 14-45% by weight of water.
7. The water-based tire sealant and inflator composition of any one of Claims 1-5 in which the composition comprises 4-10% by weight of acrylic resin, 20-35% by weight of propellant and 22-40% by weight of water.
8. A water-based tire sealant and inflator composition comprising:
  - a) an acrylic resin;
  - b) an alkyl acetate solvent;
  - c) a surfactant; and,
  - c) water,said composition forming a two-phase liquid system.
9. The water-based tire sealant and inflator composition of Claim 8 in which the composition further comprises a propellant selected from a hydrofluorocarbon and a perfluorocarbon.

10. The water-based tire sealant and inflator composition of Claim 8 or Claim 9 in which the acrylic resin is an acrylic acid polymer, an acrylic acid co-polymer, a methacrylic acid polymer or a methacrylic acid co-polymer or a polymer or co-polymer of ester derivatives of acrylic acid or methacrylic acid.

11. The water-based tire sealant and inflator composition of Claim 10 in which the acrylic resin is selected from the group consisting of methyl/n-butyl methacrylate copolymer, methacrylate copolymer, ethyl methacrylate copolymer, n-butyl methacrylate copolymer, isobutyl methacrylate copolymer, n-butyl/isobutyl methacrylate copolymer, and ethyl methacrylate copolymer.

12. The water-based tire sealant and inflator composition of any one of Claims 8-11 in which the composition further comprises a propellant selected from 1,1,1,2,3,3,3-heptafluoropropane, trifluoromethane, difluoromethane, pentafluoroethane, 1,1,1,2-tetra-fluoroethane, 1,1-difluoroethane, perfluoropropane and perfluorobutane, and mixtures thereof.

13. The water-based tire sealant and inflator composition of any one of Claims 8-12 in which the solvent is an alkyl acetate of the formula:



in which R is an alkyl group having 6-13 carbon atoms.

14. The water-based tire sealant and inflator composition of any one of Claims 8-12 in which the two-phase liquid system is an emulsion with aqueous and organic phases.

15. The water-based tire sealant and inflator composition of any one of Claims 8-13 in which the two-phase liquid system is a dispersion with aqueous and organic phases.

16. The water-based tire sealant and inflator composition of any one of Claims 8-15 in which the composition comprises 3-13% by weight of acrylic resin, 15-45% by weight of propellant, 14-45% by weight of water and 6-30% by weight of alkyl acetate solvent.

17. The water-based tire sealant and inflator composition of any one of Claims 8-15 in which the composition comprises 4-10% by weight of acrylic resin, 20-35% by weight of propellant, 22-40% by weight of water and 10-22% by weight of alkyl acetate solvent.

18. A water-based tire sealant and inflator composition comprising:

a) an acrylic resin;

b) an alkyl acetate solvent;

c) a surfactant;

d) additives selected from extenders and thixotropic clays, and mixtures thereof;

and

e) a propellant selected from a hydrofluorocarbon and a perfluorocarbon, said composition being in the form of a dispersion.

19. A water-based tire sealant and inflator composition comprising:

- a) an acrylic resin;
  - b) an alkyl acetate solvent;
  - c) a surfactant;
  - d) additives selected from extenders and thixotropic clays, and mixtures thereof;
- and
- e) a propellant selected from a hydrofluorocarbon and a perfluorocarbon, said composition being in the form of an emulsion.

20. The water-based tire sealant and inflator composition of Claim 18 or Claim 19 in which the surfactant has an HLB in the range of 11.0 to 16.0

21. The water-based tire sealant and inflator composition of Claim 20 in which the surfactant has an HLB in the range of 12.5 to 14.5.

22. The water-based tire sealant and inflator composition of any one of Claims 18-21 in which the surfactant is octylphenoxypolyethoxyethanol and nonylphenoxypolyethoxyethanol.

23. The water-based tire sealant and inflator composition of any one of Claims 18-22 in which the acrylic resin is an acrylic acid polymer, an acrylic acid co-polymer, a methacrylic acid polymer or a methacrylic acid co-polymer or a polymer or co-polymer of ester derivatives of acrylic acid or methacrylic acid.

24. The water-based tire sealant and inflator composition of Claim 23 in which the acrylic resin is selected from the group consisting of methyl/n-butyl methacrylate copolymer, methacrylate copolymer, ethyl methacrylate copolymer, n-butyl methacrylate copolymer, isobutyl methacrylate copolymer, n-butyl/isobutyl methacrylate copolymer, and ethylmethacrylate copolymer.

25. The water-based tire sealant and inflator composition of any one of Claims 18-24 in which the propellant is selected from 1,1,1,2,3,3,3-heptafluoropropane, trifluoromethane, difluoromethane, pentafluoroethane, 1,1,1,2-tetra-fluoroethane, 1,1-difluoroethane, perfluoropropane and perfluorobutane, and mixtures thereof.

26. The water-based tire sealant and inflator composition of any one of Claims 18-25 in which the solvent is an alkyl acetate of the formula:



in which R is an alkyl group having 6-13 carbon atoms.

27. The water-based tire sealant and inflator composition of any one of Claims 18-26 in which the two-phase liquid system is an emulsion with aqueous and organic phases.

28. The water-based tire sealant and inflator composition of any one of Claims 18-23 in which the composition comprises 3-13% by weight of acrylic resin, 15-45% by weight of propellant, 14-45% by weight of water, 6-30% by weight of alkyl acetate solvent, 0.3-

4.5% by weight of surfactant, 3-20% by weight of extenders and 0-8% by weight of thixotropic clays.

29. The water-based tire sealant and inflator composition of any one of Claims 18-27 in which the composition comprises 4-10% by weight of acrylic resin, 20-35% by weight of propellant, 22-40% by weight of water and 10-22% by weight of alkyl acetate solvent, 1-3% by weight of surfactant, 7-15% by weight of extenders and 1-4% by weight of thixotropic clays.