[0050] It is yet another object of the invention to provide a plastisol formulation utilizing a non-phthalate plasticizer, which provides higher tensile strength and stain and extraction resistance.

[0051] Still further objects of the invention are to provide an adhesive formulation and an overprint varnish utilizing the non-phthalate plasticizer triblend of the invention.

[0052] Other objects of the invention will be apparent from the description herein.

SUMMARY OF THE INVENTION

[0053] Plasticizer blends of the present invention comprise unique blends of three dibenzoate esters: diethylene glycol dibenzoate (DEGDB), dipropylene glycol dibenzoate (DPGDB), and 1,2-propylene glycol dibenzoate (PGDB). These plasticizers are compatible with each other and with various polymers such as elastomers, thermoplastics, and thermosets; such as, for example, polyvinyl chloride and copolymers thereof; various polyurethanes and copolymers thereof; various polysulfides; various polyacrylates and copolymers thereof; various polysulfides and copolymers thereof; various epoxies and copolymers thereof; and vinyl acetate and copolymers thereof.

[0054] The inventive plasticizer triblend functions in PVC applications as a high solvator, but with unexpectedly lower viscosity and improved rheology characteristics than would be expected based upon the individual triblend components alone.

[0055] In one embodiment, the invention is directed to a novel plastisol composition, comprising a polymer dispersed in a liquid phase consisting of the inventive triblend, wherein the viscosity of the plastisol is lower than that which would have been expected with the use of PGDB blended with a 4:1 DEGDB/DPGDB blend.

[0056] In another embodiment, the invention is directed to an adhesive composition comprising a polymer dispersed in a liquid phase consisting of the inventive triblend, wherein the Tg of the adhesive is unexpectedly lower than that achieved with PGDB alone and similar to that achieved with the 4:1 DEGDB/DPGDB blend. The inventive plasticizer triblend is more efficient than PGDB alone in

WHAT IS CLAIMED IS:

1. A plasticizer triblend composition comprising:
   a. diethylene glycol dibenzoate present in amounts ranging from about 10 to about 90 wt.%,
   b. dipropylene glycol dibenzoate present in amounts ranging from about 1 to about 50 wt.%, and
   c. 1, 2- propylene glycol dibenzoate present in amounts ranging from about 10 to about 90 wt.%,

   based upon the total weight of the triblend composition,
   wherein the triblend is useful either alone as a primary plasticizer or as a specialty blending plasticizer to improve compatibility and processability of poor solvating plasticizers.

2. The plasticizer triblend composition of claim 1,
   wherein the diethylene glycol dibenzoate is present in amounts of at least about 60 wt.%,
   wherein the dipropylene glycol dibenzoate is present in amounts of at least about 10 wt.%, and
   wherein the 1, 2-dipropylene glycol dibenzoate is present in amounts of at least about 20 wt.%.

3. The plasticizer triblend composition of claim 1, wherein the blend comprises 80 wt.% of a mixture of diethylene glycol dibenzoate and dipropylene glycol dibenzoate, wherein the ratio of DEGDB to DPGDB is about 4:1, and 20 wt. % of 1,2-propylene glycol dibenzoate, based upon the total weight of the plasticizer triblend.

4. The plasticizer triblend of claim 1 further comprising: a conventional plasticizer selected from the group consisting of phthalate esters; phosphate esters; adipate, azelate, oleate, and sebacate compounds; succinates;

terephthalates; 1,2-cyclohexane dicarboxylates; epoxy plasticizers; fatty acid esters; glycol derivatives; sulfonamides; cellulose esters; phenolic resins; amino resins; amide and protein plastics; hydrocarbons and hydrocarbon derivatives; monobenzoates; 2,2,4-trimethyl-1,3-pentanediol diisobutyrate, and mixtures thereof.

5. A plastisol composition, comprising:
   a. a dispersed phase of an organic polymer; and
   b. a liquid phase, non-phthalate, high solvating plasticizer triblend comprising diethylene glycol dibenzoate, dipropylene glycol dibenzoate, and 1, 2- propylene glycol dibenzoate,

   wherein the processing viscosity of the plastisol composition is better than expected when compared to the viscosities of its components and at least comparable to that achieved with traditional dibenzoate diblends, and
   wherein the plastisol has superior stain resistance as compared to phthalate plasticizers.

6. The plastisol composition as set forth in claim 5,
   wherein the organic polymer in the dispersed phase is present at 100 parts by weight, and
   wherein the plasticizer triblend is present at from about 1 part to about 300 parts by weight for every 100 parts by weight of polymer.

7. A plastisol composition as set forth in claim 6, wherein the plasticizer triblend is present at about 70 parts by weight for every 100 parts by weight of polymer.

8. A coating composition comprising:
   a. an acrylic, vinyl acrylic, VAE, or styrenated acrylic polymer, or any combination thereof,
   b. the plasticizer triblend of claim 1,

c. one or more conventional coating additives; and
d. optionally, a conventional plasticizer or coalescent.

9. An adhesive composition comprising:
a. a polyvinyl acetate, a polyvinyl acetate ethylene copolymer, or mixtures thereof;
b. the plasticizer triblend of claim 1;and
c. at least one adhesive additive.

10. A caulk or a sealant comprising: a latex polymer, the plasticizer of claim 1, optionally a filler and at least one conventional caulk or sealant additive.

11. A plastisol screen ink composition comprising the plasticizer of claim 1.

12. An overprint varnish for use in graphic art applications comprising the plasticizer of claim 1.

13. A method of preparing a plastisol composition comprising the steps of:
a. blending diethylene glycol dibenzoate, dipropylene glycol dibenzoate, and 1,2-propylene glycol dibenzoate together to form a plasticizer triblend; and
b. dispersing a PVC or acrylic polymer in the plasticizer triblend.

[0050] It is yet another object of the invention to provide a plastisol formulation utilizing a non-phthalate plasticizer, which provides higher tensile strength and stain and extraction resistance.

[0051] Still further objects of the invention are to provide an adhesive formulation and an overprint varnish utilizing the non-phthalate plasticizer triblend of the invention.

[0052] Other objects of the invention will be apparent from the description herein.

SUMMARY OF THE INVENTION

[0053] Plasticizer blends of the present invention comprise unique blends of three dibenzoate esters: diethylene glycol dibenzoate (DEGDB), dipropylene glycol dibenzoate (DPGDB), and 1,2-propylene glycol dibenzoate (PGDB). These plasticizers are compatible with each other and with various polymers such as elastomers, thermoplastics, and thermosets; such as, for example, polyvinyl chloride and copolymers thereof; various polyurethanes and copolymers thereof; various polyacrylates and copolymers thereof; various polysulfides and copolymers thereof; various epoxies and copolymers thereof; and vinyl acetate and copolymers thereof.

[0054] The inventive plasticizer triblend functions in PVC applications as a high solvator, but with unexpectedly lower viscosity and improved rheology characteristics than would be expected based upon the individual triblend components alone.

[0055] In one embodiment, the invention is directed to a novel plastisol composition, comprising a polymer dispersed in a liquid phase consisting of the inventive triblend, wherein the viscosity of the plastisol is lower than that which would have been expected with the use of PGDB blended with a 4:1 DEGDB/DPGDB blend.

[0056] In another embodiment, the invention is directed to an adhesive composition comprising a polymer dispersed in a liquid phase consisting of the inventive triblend, wherein the Tg of the adhesive is unexpectedly lower than that achieved with PGDB alone and similar to that achieved with the 4:1 DEGDB/DPGDB blend. The inventive plasticizer triblend is more efficient than PGDB alone in

WHAT IS CLAIMED IS:

1. A plasticizer triblend composition comprising:
   a. diethylene glycol dibenzoate present in amounts of at least about 60 wt.%,
   b. dipropylene glycol dibenzoate present in amounts of at least about 10 wt.%, and
   c. 1, 2- propylene glycol dibenzoate present in amounts of at least about 20 wt.%,
   based upon the total weight of the triblend composition,
   wherein the triblend is useful either alone, as a primary plasticizer or as a specialty blending plasticizer to improve compatibility and processability of poor solvating plasticizers.

2. The plasticizer triblend composition of claim 1, wherein the blend comprises 80 wt.% of a mixture of diethylene glycol dibenzoate and dipropylene glycol dibenzoate, wherein the ratio of DEGDB to DPGDB is about 4: 1, and 20 wt.% of 1,2-propylene glycol dibenzoate, based upon the total weight of the plasticizer triblend.

3. The plasticizer triblend of claim 1 further comprising: a conventional plasticizer selected from the group consisting of phthalate esters; phosphate esters; adipate, azelate, oleate, and sebacate compounds; succinates; terephthalates; 1,2-cyclohexane dicarboxylates; epoxy plasticizers; fatty acid esters; glycol derivatives; sulfonamides; cellulose esters; phenolic resins; amino resins; amide and protein plastics; hydrocarbons and hydrocarbon derivatives; monobenzoates; 2,2,4-trimethyl- l ,3-pentanediol diisobutyrate, and mixtures thereof.

4. A plastisol composition, comprising:
   a. a dispersed phase of an organic polymer present at 100 parts by weight; and
   b. a liquid phase, non-phthalate, high solvating plasticizer triblend, present at from about 1 part to about 300 parts by weight for every 100 parts by weight of polymer, wherein the triblend comprises a mixture of diethylene glycol dibenzoate present in amounts of at least about 60 wt.%, dipropylene glycol dibenzoate present in amounts of at least about 10 wt.%, and 1, 2- propylene glycol dibenzoate present in amounts of at least about 20 wt.%, based on the total weight of the triblend,

   wherein the processing viscosity of the plastisol composition is better than expected when compared to the viscosities of its individual components and at least comparable to that achieved with traditional dibenzoate diblends, and

wherein the plastisol has superior stain resistance as compared to phthalate plasticizers.

5. A plastisol composition as set forth in claim 4, wherein the plasticizer triblend is present at about 70 parts by weight for every 100 parts by weight of polymer.

6. A coating composition comprising:
   a. an acrylic, vinyl acrylic, VAE, or styrenated acrylic polymer, or any combination thereof,
   b. the plasticizer triblend of claim 1,
   c. one or more conventional coating additives; and
   d. optionally, a conventional plasticizer or coalescent.

7. An adhesive composition comprising:
   a. a polyvinyl acetate, a polyvinyl acetate ethylene copolymer, or mixtures thereof;
   b. the plasticizer triblend of claim 1 ;and
   c. at least one adhesive additive.

8. A caulk or a sealant comprising: a latex polymer, the plasticizer of claim 1, optionally a filler and at least one conventional caulk or sealant additive.

9. A plastisol screen ink composition comprising the plasticizer of claim 1.

10. An overprint varnish for use in graphic art applications comprising the plasticizer of claim 1.

11. A method of preparing a plastisol composition comprising the steps of:
   a. blending diethylene glycol dibenzoate, dipropylene glycol dibenzoate, and

      1,2-propylene glycol dibenzoate together to form a plasticizer triblend, wherein the triblend comprises an 80 wt.% mixture of diethylene glycol dibenzoate and dipropylene glycol dibenzoate in a ratio of 4: 1 DEGDB to DPGDB, and 20 wt.% of 1, 2- propylene glycol dibenzoate, based on the total weight of the triblend; and
   b. dispersing a PVC or acrylic polymer in the plasticizer triblend.