PAVEMENT MARKING COMPOSITIONS

FIELD

This invention relates to compositions that are useful as pavement marking compositions.

BACKGROUND

Pavement markings (e.g., paints, tapes, and individually mounted articles) guide and direct motorists and pedestrians traveling along roadways and paths. Paint was a preferred pavement marking for many years. However, modern liquid pavement marking materials offer significant advantages over paint, such as increased visibility, retroreflectance, improved durability, and temporary and/or removable marking options.

Examples of modern pavement marking materials include, for example, thermoplastic pavement marking sheet materials, tapes, compositions and raiser pavement markers. Many thermoplastic pavement markings include maleic-modified rosin ester (MMRE) resins. C5 hydrocarbon resins are also commonly used in pavement markings. In fact, many current government pavement marking specifications around the globe require MMRE resins or C5 hydrocarbon resins.

Pavement markers made with liquid pavement marking materials may include optical elements such as glass beads or microspheres adhered to the pavement surface in order to provide improved retroreflectivity.

SUMMARY

Pavement markings are subject to continuous wear and exposure to the elements as well as road chemicals. One common failure mode of thermoplastic pavement marking systems is their inability to stay white on the road. Although retroreflectivity from glass beads can provide visibility at night, a dirty pavement marking can become ineffective during daylight.

In view of the above, we recognize that there is a need in the art for pavement marking materials that have improved dirt resistance but that will still fall within current government specifications.

Briefly, the present disclosure relates to a blend comprising (a) a binder comprising (i) C5 hydrocarbon resin or (ii) a resin comprising rosin acids, rosin esters, modified rosin acids, modified rosin esters or mixtures thereof and (b) polydimethylsiloxane polyamide copolymer. ~~In one aspect, the present disclosure relates to a composition comprising a blend comprising (a) a binder comprising (i) C5 hydrocarbon resin or (ii) a resin comprising rosin acids, rosin esters, modified rosin acids, modified rosin esters or mixtures thereof; and (b) polydimethylsiloxane polyamide copolymer.~~

The present disclosure relates to thermoplastic pavement marking compositions comprising a blend comprising (a) maleic-modified rosin ester resin, (b) polydimethylsiloxane polyamide copolymer, (c) calcium carbonate filler, (d) titanium dioxide or yellow organic pigment, and (e) glass beads. In ~~another~~ one aspect, the present disclosure relates to a thermoplastic pavement marking composition comprising a blend comprising (a) maleic-modified rosin ester resin; (b) polydimethylsiloxane polyamide copolymer; (c) calcium carbonate filler; (d) titanium dioxide or yellow organic pigment; and (e) transparent glass beads.

In another aspect, the present disclosure relates to a thermoplastic pavement marking composition comprising a blend comprising (a) C5 hydrocarbon resin; (b) polydimethylsiloxane polyamide copolymer; (c) calcium carbonate filler; (d) titanium dioxide or yellow organic pigment; and (e) transparent glass beads.

The compositions of the disclosure provide improved hydrophobic surface properties and thus may provide for improved whiteness retention and reduced dirt pickup when used in pavement markings

We claim:

~~1. A composition comprising a blend comprising:~~

~~(a) a binder comprising (i) C5 hydrocarbon resin or (ii) a resin comprising rosin acids, rosin esters, modified rosin acids, modified rosin esters or mixtures thereof; and~~

~~(b) polydimethylsiloxane polyamide copolymer.~~

~~2. The composition of claim 1 wherein the binder comprises maleic-modified rosin ester resin.~~

~~3. The composition of any of the preceding claims further comprising optical components.~~

~~4. The composition of claim 3 wherein the optical components are transparent glass beads.~~

~~5. The composition of any of the preceding claims further comprising a whitening agent or a yellow organic pigment.~~

~~6.~~1. A thermoplastic pavement marking composition comprising a blend comprising:

(a) maleic-modified rosin ester resin;

(b) polydimethylsiloxane polyamide copolymer;

(c) calcium carbonate filler;

(d) titanium dioxide or yellow organic pigment; and

(e) transparent glass beads.

~~7.~~2. A thermoplastic pavement marking composition comprising a blend comprising:

(a) C5 hydrocarbon resin;

(b) polydimethylsiloxane polyamide copolymer;

(c) calcium carbonate filler;

(d) titanium dioxide or yellow organic pigment; and

(e) transparent glass beads.

~~8.~~3. The pavement marking composition of claim ~~6~~1 wherein the composition comprises from about 10 wt. % to about 20 wt. % maleic-modified rosin ester resin.

~~9.~~4. The pavement marking composition of claim ~~7~~2 wherein the composition comprises from about 10 wt. % to about 20 wt. % C5 hydrocarbon resin.

~~10.~~5. The pavement marking composition of any of claims ~~6~~1 – ~~9~~4 wherein the composition comprises from about 0.5 wt. % to about 10 wt. % polydimethylsiloxane polyamide copolymer.

~~11.~~6. The pavement marking composition of any of claims ~~6~~1 – ~~10~~5 wherein the composition comprises from about 5 wt. % to about 15 wt. % titanium dioxide.

~~12.~~7. The pavement marking composition of any of claims ~~6~~1 – ~~10~~5 wherein the composition comprises from about 0.5 wt. % to about 2.5 wt. % yellow organic pigment.

~~13.~~8. The pavement marking composition of any of claims ~~6~~1 – ~~12~~7 wherein the composition comprises from about 15 wt. % to about 40 wt. % transparent glass beads.

~~14.~~9. The pavement marking composition of any of claims ~~6~~1 – ~~13~~8 further comprising from about 1 wt. % to about 5 wt. % polypropylene or polyethylene wax.

~~15.~~10. The pavement marking composition of any of claims ~~6~~1 – ~~14~~9 further comprising plasticizer.

~~16.~~11. The pavement marking composition of claim ~~15~~ 10 wherein the composition comprises 0.1 wt. % to about 3 wt. % plasticizer.

~~17.~~12. The pavement marking composition of any of claims ~~6~~ 1 – ~~15~~ 10 wherein the average molecular weight of the polydimethylsiloxane polyamide copolymer is from about 10,000 g/mole to about 100,000 g/mole.