

In carrying out the simultaneous blending and shearing in accordance with one embodiment of the present invention, the two ethylene-propylene components undergo shearing to reduce molecular weights and sometimes molecular weight distribution (MWD), resulting in an intimate admixture exhibiting increased viscosity at ambient temperatures.

A feature of an embodiment of the present invention is to provide a lubricating oil composition comprising a major amount of oil of a lubricating viscosity, a performance additive package appropriate for the quality and performance levels, a pour point depressant, and a viscosity index improving amount of an oil soluble polymer mixture comprising: an ethylene-propylene polymer blend having a number average molecular weight within the range of 20,000 to 300,000 and a molecular weight distribution within the range of 1.3 to 5 prepared by the process comprising blending or simultaneously blending and shearing:

(a) an essentially amorphous low ethylene content ethylene-propylene polymer containing an ethylene to propylene mole ratio within the range of 35/65 to 65/35, having a number average molecular weight within the range of 40,000 to 300,000 and a molecular weight distribution within the range of 1.3 to 5.0; and

(b) a partially crystalline higher ethylene content ethylene-propylene polymer containing an ethylene to propylene molar ratio within the range of 65/35 to 85/15, having 3-25 weight percent crystallinity, and, having a number average molecular weight within the range of 40,000 to 300,000 and a molecular weight distribution within the range of 1.3 to 5.0; whereby the blending, or simultaneous blending and shearing, is carried out under conditions of heat and mechanical work sufficient to create high shear conditions for a time sufficient to reduce the molecular weight and molecular weight distribution of the blend of (a) and (b), wherein the weight ratio of the low ethylene content ethylene-propylene polymer (a) to the higher ethylene content ethylene-propylene polymer (b) is within the range of 45/55 to 10/90 and wherein the gel index of the lubricating oil composition is below 6.

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referred to herein as a copolymer) blend containing (a) an essentially amorphous low ethylene content ethylene-propylene polymer containing an ethylene to propylene mole ratio within the range of 35/65 to 65/35, having a number average molecular weight within the range of about 20,000 to about 300,000 and a molecular weight distribution within the range of about 1.3 to about 5; and (b) a partially crystalline higher ethylene content ethylene-propylene polymer containing an ethylene to propylene molar ratio within the range of about 65/35 to about 85/15, having a number average molecular weight within the range of about 40,000 to about 300,000 and a molecular weight distribution within the range of about 1.3 to about 5.0, and wherein the total mol percent ethylene content of the blend is from about 65 to about 80.

Another feature of the present invention is to provide a polymer blend with improved low temperature properties when used as a viscosity index improver in engine oil formulations.

A further feature of the present invention is to provide a polymer blend for use in viscosity index improver applications in an engine oil and exhibiting improved shear stability.

Another feature of the present invention is to provide a use of the lubricating oil composition as defined above in lubricating an automotive engine.

By "blend" herein is meant a physical mixture or admixture, combination, solid or liquid, solution or dispersion of components.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are intended to provide further

CLAIMS:

1. A lubricating oil composition comprising a major amount of oil of a lubricating viscosity, a performance additive package appropriate for the quality and performance levels, a pour point depressant, and a viscosity index improving amount of an oil soluble polymer mixture comprising: an ethylene-propylene polymer blend having a number average molecular weight within the range of 20,000 to 300,000 and a molecular weight distribution within the range of 1.3 to 5 prepared by the process comprising blending or simultaneously blending and shearing:

(a) an essentially amorphous low ethylene content ethylene-propylene polymer containing an ethylene to propylene mole ratio within the range of 5035/5065 to 65/35, having a number average molecular weight within the range of 40,000 to 300,000 and a molecular weight distribution within the range of 1.3 to 5.0; and

(b) a partially crystalline higher ethylene content ethylene-propylene polymer containing an ethylene to propylene molar ratio within the range of 65/35 to 85/15, having 3-25 weight percent crystallinity, and, having a number average molecular weight within the range of 40,000 to 300,000 and a molecular weight distribution within the range of 1.3 to 5.0;

whereby the blending, or simultaneous blending and shearing, is carried out under conditions of heat and mechanical work sufficient to create high shear conditions for a time sufficient to reduce the molecular weight and molecular weight distribution of the blend of (a) and (b), wherein the weight ratio of the low ethylene content ethylene-propylene polymer (a) to the higher ethylene content ethylene-propylene polymer (b) is within the range of 45/55 to 10/90 and ~~the ethylene mol%~~ in the partially crystalline higher ethylene content ethylene-propylene polymer is between 80.5 and 84 mol% wherein the gel index of the lubricating oil composition is below 6.

2. Use of the lubricating oil composition of claim 1 in lubricating an automotive engine.