CLAIMS :

1. An automotive transmission fluid composition consisting of :

(i) a lubricating oil, or blend of lubricating oils;
(ii) a viscosity modifier additive or blend of viscosity modifier additives;
(iii) a polyalphaolefin compound or compounds; and
(iv) one or more detergent additives,

wherein the or each polyalphaolefin compound (iii) is made by the metallocene-catalysed polymerisation of an alphaolefin feedstock, and wherein the total amount of the polyalphaolefin compound(s) (iii) in the transmission fluid composition does not exceed 4 percent by weight of the composition; and

wherein at least one viscosity modifier additive (ii) contains a polymer or blend of polymers selected from one or more of the following groups:

(ii)(a) random or block poly-alkylacrylates or poly-alkylmethacrylates, or copolymers thereof;
(ii)(b) star polymers comprising a polyvalent core of polyalkylacrylate or polyalkylmethacrylate from which a plurality or arms depend, the arms being polymer chains containing alkylacrylate or alkylmethacrylate monomer units; or
(ii)(c) comb polymers prepared by the copolymerisation of one or more alkylacrylate or alkylmethacrylate monomers with one or more olefin or polyolefin monomers.

2. The transmission fluid composition of claim 1, wherein the total amount of the polyalphaolefin compound or compounds (iii) in the composition is in the range of 2 to 3 percent by weight of the composition.

3. The transmission fluid compositon of claim 1 or claim 2, wherein the viscosity modifier additive is, or the blend of viscosity modifiers comprises, one or more polymers selected from the groups (ii)(b) and/or (ii)(c).

4. The transmission fluid of any preceding claim, wherein one or more detergent additives (iv) comprises one or more alkaline earth metal detergent compounds, wherein at least one alkaline earth metal detergent compound is an alkaline earth metal salicylate or sulphonate compound.

5. The transmission fluid of claim 4, wherein one or more detergent additives (iv) comprises a neutral or overbased calcium salicylate compound.

6. A process for the manufacture of an automotive transmission fluid composition, the composition consisting of :

(i) a lubricating oil, or blend of lubricating oils;

(ii) a viscosity modifier additive or blend of viscosity modifier additives containing a polymer or blend of polymers selected from one or more of the following groups:

(ii)(a) random or block poly-alkylacrylates or poly-alkylmethacrylates, or copolymers thereof;

(ii)(b) star polymers comprising a polyvalent core of polyalkylacrylate or polyalkylmethacrylate from which a plurality or arms depend, the arms being polymer chains containing alkylacrylate or alkylmethacrylate monomer units; or

(ii)(c) comb polymers prepared by the copolymerisation of one or more alkylacrylate or alkylmethacrylate monomers with one or more olefin or polyolefin monomers;

(iii) a polyalphaolefin compound or compounds, each made by the metallocene-catalysed polymerisation of an alphaolefin feedstock; and

(iv) one or more detergent additives;

the process comprising the following steps :

a) obtaining (by manufacture or otherwise) a lubricating oil or blend of lubricating oils containing no polyalphaolefin compound(s) made by the metallocene-catalysed polymerisation of an alphaolefin feedstock; and

b) mixing with this lubricating oil or blend of lubricating oils the following :

(b)(1) the viscosity modifier additive or blend of viscosity modifier additives (ii),
(b)(2) the polyalphaolefin compound(s) (iii) in a total amount not exceeding 4 percent by weight of the transmission fluid composition, and
(b)(3) one or more detergent additives (iv);

to provide the transmission fluid composition.

7. The process of claim 6, wherein the total amount of the polyalphaolefin compound or compounds (iii) mixed with the lubricating oil or blend of lubricating oils is in the range of 2 to 3 percent by weight of the transmission fluid composition.

8. The process of claim 6 or claim 7, wherein the viscosity modifier additive is, or the blend of viscosity modifiers comprises, one or more polymers selected from the groups (ii)(b) and/or (ii)(c).

9. The process of claim 6 or claim 7, wherein one or more detergent additives (iv) comprises one or more alkaline earth metal detergent compounds, wherein at least one alkaline earth metal detergent compound is an alkaline earth metal salicylate or sulphonate compound.

10. The process of claim 9, wherein one or more detergent additives (iv) comprises a neutral or overbased calcium salicylate compound.

11. A method of improving the energy efficiency of an automotive transmission, comprising the use therein of the automotive transmission fluid composition defined in any of claims 1 to 5, or of the automotive transmission fluid composition obtained by the process in any of claims 6 to 10.

12. The method of claim 11, wherein the improvement in energy efficiency is an increase in fuel economy of the vehicle during operation.

13. An additive concentrate for an automotive transmission fluid, the concentrate consisting of a suitable carrier liquid, (ii) a viscosity modifier or blend of viscosity modifiers, and (iii) a polyalphaolefin compound or mixture of polyalphaolefin compounds made by the

metallocene-catalysed polymerisation of an alphaolefin feedstock, and (iv) one or more detergent additives;

wherein at least one viscosity modifier additive (ii) contains a polymer or blend of polymers selected from one or more of the following groups:

(ii)(a) random or block poly-alkylacrylates or poly-alkylmethacrylates, or copolymers thereof;

(ii)(b) star polymers comprising a polyvalent core of polyalkylacrylate or polyalkylmethacrylate from which a plurality or arms depend, the arms being polymer chains containing alkylacrylate or alkylmethacrylate monomer units, or

(ii)(c) comb polymers prepared by the copolymerisation of one or more alkylacrylate or alkylmethacrylate monomers with one or more olefin or polyolefin monomers.

14. The additive concentrate of claim 13, wherein the total amount of polyalphaolefin compound(s) (iii) present in the concentrate is such that after addition of the concentrate at its specified treat rate to the transmission fluid, said compounds (iii) constitute no more than 4 percent by weight, preferably no more than 2 to 3 percent by weight, of the resulting transmission fluid composition.

15. The additive concentrate of claim 14, wherein at least one detergent additive (iv) present in the concentrate comprises one or more alkaline earth metal detergent compounds, wherein at least one alkaline earth metal detergent compound is an alkaline earth metal salicylate or sulphonate compound.

CLAIMS :

1. An automotive transmission fluid composition consisting of :

(i) a lubricating oil, or blend of lubricating oils;
(ii) a viscosity modifier additive or blend of viscosity modifier additives;
(iii) a polyalphaolefin compound or compounds; and
(iv) one or more detergent additives,

wherein the or each polyalphaolefin compound (iii) is made by the metallocene-catalysed polymerisation of an alphaolefin feedstock, and wherein the total amount of the polyalphaolefin compound(s) (iii) in the transmission fluid composition is greater than 1 percent but does not exceed 4 percent by weight of the composition; and

wherein at least one viscosity modifier additive (ii) contains a polymer or blend of polymers selected from one or more of the following groups:

(ii)(a) random or block poly-alkylacrylates or poly-alkylmethacrylates, or copolymers thereof;
(ii)(b) star polymers comprising a polyvalent core of polyalkylacrylate or polyalkylmethacrylate from which a plurality or arms depend, the arms being polymer chains containing alkylacrylate or alkylmethacrylate monomer units; or
(ii)(c) comb polymers prepared by the copolymerisation of one or more alkylacrylate or alkylmethacrylate monomers with one or more olefin or polyolefin monomers.

2. The transmission fluid composition of claim 1, wherein the total amount of the polyalphaolefin compound or compounds (iii) in the composition is in the range of 2 to 3 percent by weight of the composition.

3. The transmission fluid compositon of claim 1 or claim 2, wherein the viscosity modifier additive is, or the blend of viscosity modifiers comprises, one or more polymers selected from the groups (ii)(b) and/or (ii)(c).

4. The transmission fluid compositon of any preceding claim, wherein one or more detergent additives (iv) comprises one or more alkaline earth metal detergent compounds, wherein at least one alkaline earth metal detergent compound is an alkaline earth metal salicylate or sulphonate compound.

5. The transmission fluid composition of claim 4, wherein one or more detergent additives (iv) comprises a neutral or overbased calcium salicylate compound.

6. A process for the manufacture of an automotive transmission fluid composition, the composition consisting of :

(i) a lubricating oil, or blend of lubricating oils;

(ii) a viscosity modifier additive or blend of viscosity modifier additives containing a polymer or blend of polymers selected from one or more of the following groups:

(ii)(a) random or block poly-alkylacrylates or poly-alkylmethacrylates, or copolymers thereof;

(ii)(b) star polymers comprising a polyvalent core of polyalkylacrylate or polyalkylmethacrylate from which a plurality or arms depend, the arms being polymer chains containing alkylacrylate or alkylmethacrylate monomer units; or

(ii)(c) comb polymers prepared by the copolymerisation of one or more alkylacrylate or alkylmethacrylate monomers with one or more olefin or polyolefin monomers;

(iii) a polyalphaolefin compound or compounds, each made by the metallocene-catalysed polymerisation of an alphaolefin feedstock; and

(iv) one or more detergent additives;

the process comprising the following steps :

a) obtaining (by manufacture or otherwise) a lubricating oil or blend of lubricating oils containing no polyalphaolefin compound(s) made by the metallocene-catalysed polymerisation of an alphaolefin feedstock; and

b) mixing with this lubricating oil or blend of lubricating oils the following :

(b)(1) the viscosity modifier additive or blend of viscosity modifier additives (ii),
(b)(2) the polyalphaolefin compound(s) (iii) in a total amount greater than 1 percent but not exceeding 4 percent by weight of the transmission fluid composition, and
(b)(3) one or more detergent additives (iv);

to provide the transmission fluid composition.

7. The process of claim 6, wherein the total amount of the polyalphaolefin compound or compounds (iii) mixed with the lubricating oil or blend of lubricating oils is in the range of 2 to 3 percent by weight of the transmission fluid composition.

8. The process of claim 6 or claim 7, wherein the viscosity modifier additive is, or the blend of viscosity modifiers comprises, one or more polymers selected from the groups (ii)(b) and/or (ii)(c).

9. The process of claim 6 or claim 7, wherein one or more detergent additives (iv) comprises one or more alkaline earth metal detergent compounds, wherein at least one alkaline earth metal detergent compound is an alkaline earth metal salicylate or sulphonate compound.

10. The process of claim 9, wherein one or more detergent additives (iv) comprises a neutral or overbased calcium salicylate compound.

11. A method of improving the energy efficiency of an automotive transmission, comprising the use therein of the automotive transmission fluid composition defined in any of claims 1 to 5, or of the automotive transmission fluid composition obtained by the process in any of claims 6 to 10.

12. The method of claim 11, wherein the improvement in energy efficiency is an increase in fuel economy of the vehicle during operation.