Claims

1. A lubricating oil composition comprising:
   a) a base oil mixture comprising
      - at least 13 wt% of a renewable base oil;
      - the remainder selected from one or more base oils in the same or different API (American Petroleum Institute) category;
   b) one or more performance additives;

   wherein the renewable base oil comprises:
   - more than 60 wt% C_{31} alkanes, preferably more than 80 wt% C_{31} alkanes; and
   - less than 20 wt% C_{32} or higher alkanes, preferably less than 10 wt% C_{32} or higher alkanes;
   - less than 9 wt%, preferably less than 4.5 wt% cycloalkanes;
   - and

   wherein the at least one or more performance additives are selected from the list consisting of: antioxidants, metal deactivators, corrosion inhibitors, detergents, dispersants, antiwear additives, friction modifiers, pour point depressants, viscosity improvers, foam inhibitors, thickeners, demulsifiers, emulsifiers, bactericides, fungicides and tackiness additives;

   preferably the weight percentages of the hydrocarbon composition of the renewable base oil is measured using field ionisation mass spectrometry (FI-MS).

2. Lubricating oil composition according to claim 1, wherein the renewable base oil comprises:

   - less than 20 wt% C_{32} or higher alkanes, preferably less than 10 wt% C_{32} or higher alkanes;
   - the alkanes comprising 70 wt% or more *iso*-alkanes;

   preferably the weight percentages of the hydrocarbons measured using field ionisation mass spectrometry (FI-MS).

3. Lubricating oil composition according to anyone of the claims 1 - 2, wherein the renewable base oil comprises:

- between 1 wt% and 20 wt% C_{20-30} alkanes;
- between 0.1 wt% and 20 wt% C_{32} or higher alkanes, preferably less than 10 wt% C_{32} or higher alkanes, such as C_{32}-C_{48} alkanes,
- between 1 wt% and 8 wt% C_{25-32} cycloalkanes;
- less than 1 wt% aromatic hydrocarbons;
- less than 2 wt% di-, tri-, tetra- naphthenes, or higher;

preferably the weight percentages of the hydrocarbons measured using field ionisation mass spectrometry (FI-MS);

preferably wherein:

- the combined amount of C_{29} and C_{30} alkanes in wt% is less than the combined amount of C_{26} and C_{27} alkanes in wt%;

and/or

- the combined amount of C_{29} and C_{31} cycloalkanes in wt% being more than the combined amounts of C_{25}, C_{26}, C_{27}, C_{28}, C_{30} cycloalkanes.

4. Lubricating oil composition according to anyone of claims 1 – 3, wherein in the renewable base oil has one or more of the following properties:
   - a boiling point of between 350 °C and 650 °C as measured ASTM D7500;
   - a viscosity index (VI) of more than 140 as measured using ASTM D2270;
   - a Noack volatility number of less than 10 wt% as measured using ASTM D5800 or CECL-40-93-B;
   - a pour point of –6 °C or lower as measured using ASTM D7346;
   - a Cold-Cranking Simulator viscosity (CCS-35°C) value of less than 1800 cP as measured using ASTM D5293;
   - a kinematic viscosity at 100°C (kV100) of less than 5 cSt using EN ISO 3104;preferably wherein the renewable base oil has at least the following properties:
   - a Noack volatility number of less than 10 wt% as measured using ASTM D5800 or CECL-40-93-B; and
   - a kinematic viscosity at 100°C of (kV100) of less than 5 cSt using EN ISO 3104; or

   wherein the renewable base oil has

- a kinematic viscosity at 100°C (kV100) of 16 cSt as measured using ASTM D445; and
- a Noack volatility of at most 11 % as measured using CECL-40-93-B.

5. Lubricating oil composition according to anyone of claims 1 – 4, wherein the renewable base oil is present in an amount of at least 35 wt% based on the total base oil mixture; preferably in an amount of at least 50 wt% based on the total base oil mixture.

6. Lubricating oil composition according to anyone of claims 1 – 5, wherein the base oil mixture in addition to the at least 13 wt% of a renewable base oil, comprises two or more base oils in the same or different API category; preferably 10 – 50 wt% based on the total base oil mixture of a Group II and/or Group III base oil.

7. Lubricating oil composition according to anyone of claims 1 – 6, wherein the base oil mixture contains no more than 10 wt% of a polyalphaolefin base oil; preferably the base oil mixture contains no more than 2 wt% of polyalphaolefin base oil; more preferably the base oil mixture is free of polyalphaolefin base oil.

8. Lubricating oil composition according to anyone of claims 1 – 7, wherein the content of the renewable base oil is between 15 - 95 wt%, preferably between 20 - 90 wt% based on the total base oil mixture.

9. Base oil composition comprising:
   - more than 60 wt % C_{31} alkanes;
   - less than 20 wt% C_{32} or higher alkanes;
   - the alkanes comprising 70 wt% or more *iso*-alkanes;
   - less than 9 wt%, preferably less than 4.5 wt% cycloalkanes;

   preferably the weight percentages of the hydrocarbons measured using field ionisation mass spectrometry (FI-MS).

10. Base oil composition according to claim 9 additionally comprising:

- between 1 wt% and 10 wt% C_{20-30} alkanes;

preferably the weight percentages of the hydrocarbons measured using field ionisation mass spectrometry (FI-MS).

11. Base oil composition according to any of the claims 9-10, wherein:
    - the combined amount of C_{29} and C_{30} alkanes in wt% being less than the combined amount of C_{26} and C_{27} alkanes in wt%; and/or
    - the combined amount of C_{29} and C_{31} cycloalkanes in wt% being more than the combined amounts of C_{25}, C_{26}, C_{27}, C_{28}, C_{30} cycloalkanes;

    preferably the weight percentages of the hydrocarbons measured using field ionisation mass spectrometry (FI-MS).

12. Base oil composition according to any one of claims 9-11, wherein the composition comprises:
    - less than 0.5 wt% aromatic hydrocarbons;
    - less than 0.5 wt% di-, tri-, tetra- naphthenes, or higher;
    - less than 1 wt% of oxygen-containing compounds;
    - less than 300 ppm sulfur content as measured using ASTM D 3120;
    - less than 100 ppm nitrogen content as measured using ASTM D 4629;

    preferably the weight percentages of the hydrocarbons measured using field ionisation mass spectrometry (FI-MS).

13. Base oil composition according to any one of claims 9-12 having one or more of the following properties:
    - a boiling point of between 350 °C and 650 °C as measured using ASTM D7500, for example between 380 °C and 650 °C, such as between 420 °C and 650 °C;
    - a viscosity index (VI) of more than 140 as measured using ASTM D2270;
    - a Noack volatility number of less than 10 wt% as measured using ASTM D5800 or CECL-40-93-B;
    - a pour point of less than –10 °C as measured using ASTM D7346;
    - a Cold-Cranking Simulator viscosity (CCS-35°C) viscosity of less than 1800 cP as measured using ASTM D5293;

- a Cold-Cranking Simulator viscosity (CCS-30°C) viscosity of less than 1300 mPas as measured using ASTM D5293;
- a kinematic viscosity at 100 ^{o}C (KV100) of less than 5 mm^2/s using EN ISO 3104.

14. Base oil composition of any one of claims 9-13, comprising at least 95 wt% hydrocarbons, preferably at least 99 wt% hydrocarbons; preferably comprising at least 90 wt% alkanes; more preferably wherein the *iso*-alkanes comprise at least three different structural isomers of the C_{31} alkanes.

15. A base oil mixture comprising,
    - at least 11 wt% of a base oil composition as defined in any one of claims 9-14;
    - the remainder selected from one or more base oils in the same or in different API (American Petroleum Institute) category;
    wherein the amounts given in wt% are based on the total base oil mixture;
    wherein the composition has a kinematic viscosity at 100°C (KV100) of 16 cSt as measured using ASTM D445; and
    wherein the composition has a Noack volatility of at most 11 % as measured using CECL-40-93-B; preferably wherein the base oil composition as defined in any one of claims 9-14 is present in an amount of at least 35 wt% based on the total base oil mixture, more preferably in an amount of at least 50 wt% based on the total base oil mixture.

16. Base oil mixture according to claim 15, wherein the base oil mixture in addition to the at least 11 wt% of a base oil composition, comprises two or more base oils in the same or different API category; preferably comprising 10 – 50 wt% based on the total base oil mixture of a Group II and/or Group III base oil.

17. Base oil mixture according to any one of claims 15-16, wherein the base oil mixture contains no more than 10 wt% of an polyalphaolefin base oil, preferably where the base oil mixture contains no more than 2 wt% of polyalphaolefin base oil, preferably wherein the base oil mixture is free of polyalphaolefin base oil.

18. Base oil mixture according to any one of claims 15-17, wherein the content of the base oil composition as defined in any one of claims 9-14 is between 15 and 95 wt%, preferably between 20 and 90 wt% based on the total base oil mixture.

19. Use of a renewable base oil for reducing the Noack volatility and/or kinematic viscosity at 100 °C of a lubricating oil composition, wherein the lubricating oil composition comprises
    - a base oil mixture, including the renewable base oil; and
    - one or more performance additives;
    wherein the renewable base oil is a base oil composition as defined in any one of claims 9-14 in an amount of at least 11 wt% based on the total base oil mixture; wherein the composition has a kinematic viscosity at 100°C of 9.3 mm^2/s or less as measured using ASTM D445; wherein the composition has a Noack volatility of at most 11 % as measured using CECL-40-93-B; and
    wherein the one or more performance additives are selected from the list consisting of: antioxidants, metal deactivators, corrosion inhibitors, detergents, dispersants, antiwear additives, friction modifiers, pour point depressants, viscosity improvers, foam inhibitors, thickeners, demulsifiers, emulsifiers, bactericides, fungicides and tackiness additives.