

(IV)

wherein R is a linear or branched, saturated, unsaturated, or partially saturated hydrocarbyl group having 8 to 22 carbon atoms; and

(C) at least one compound of the formulae III and IV in combination with at least one compound of the formulae I and II;

wherein the engine oil composition is adapted for use as a crankcase engine oil lubricant suitable for lubricant of valve systems and top and bottom dead centers of pistons/cylinder linear contact zones, the engine oil composition has a phosphorus content of 50-1000 ppm and the engine oil composition comprises 0.1-2.0 wt. % of the one or more friction modifier components (A)-(C), based on the total weight of the engine oil composition.

2. The engine oil composition of claim 1, wherein the one or more friction modifier components are esters of the formula I.

3. The engine oil composition of claim 1, wherein the one or more friction modifier components are amides of the formula II.

4. The engine oil composition of claim 1, wherein the friction modifier component comprises at least one salt of the formula III.

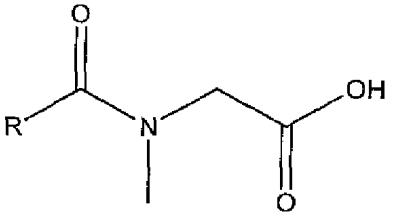
5. The engine oil composition of claim 1, wherein the additive package comprises at least two different compounds independently selected from the group consisting of compounds of the formulae I-IV.

6. The engine oil composition of claim 2, wherein R_1 is hydrocarbyl group having from 1 to 8 carbon atoms.

7. The engine oil composition of claim 2, wherein R_1 is a hydrocarbyl group containing a C_1-C_8 hydrocarbyl group containing one or more heteroatoms.

10. An engine oil composition comprising greater than 50 wt% of base oil selected from the group consisting of Group II, Group III, Group IV and Group V base oil and mixtures thereof, wherein the Group II and Group III base oils have at least 90% saturates, and an additive package, wherein the additive package comprises one or more amide reaction products of:

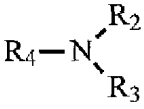
one or more compounds of the formula IV:



(IV)

wherein R is a linear or branched, saturated, unsaturated, or partially saturated hydrocarbyl group having 8 to 22 carbon atoms, and

one or more amines of the formula V:



(V)

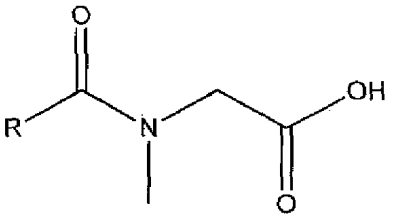
wherein R_2, R_3, and R_4 are independently selected from the group consisting of hydrogen, C_1-C_{18} hydrocarbyl groups, and hydrocarbons containing C_1-C_{18} hydrocarbyl groups and one or more heteroatoms,

wherein the engine oil composition is adapted for use as a crankcase engine oil lubricant suitable for lubrication of valve systems and top and bottom dead centers of pistons/cylinder linear contact zones, the engine oil composition has a phosphorus content of 50-1000ppm, and the engine oil composition comprises 0.1-2.0 wt. % of the amide reaction products, based on the total weight of the engine oil composition.

11. The engine oil composition of claim 10, wherein R_2, R_3, and R_4 are independently selected from the group consisting of hydrogen, C_3-C_{12} hydrocarbyl groups, and hydrocarbons containing C_3-C_{12} hydrocarbyl groups and one or more heteroatoms.

12. An engine oil composition comprising greater than 50 wt% of base oil selected from a Group II, Group III, Group IV and Group V base oil and mixtures thereof, wherein the Group II and Group III base oils have at least 90% saturates, and

an additive package, wherein the additive package comprises one or more ester reaction products of one or more alcohols with one or more compounds of the Formula IV



(IV)

wherein R is a linear or branched, saturated, unsaturated, or partially saturated hydrocarbyl group having 8 to 22 carbon atoms,

wherein the engine oil composition is adapted for use as a crankcase engine oil lubricant suitable for lubrication of valve systems and top and bottom dead centers of pistons/cylinder linear contact zones, the engine oil composition has a phosphorus content of 50-1000ppm, and the engine oil composition comprises 0.1-2.0 wt. % of the one or more alcohols with one or more compounds of the formula IV, based on the total weight of the engine oil composition.

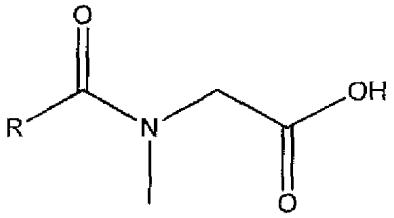
13. The engine oil composition of claim 12, wherein the one or more alcohols contain a hydrocarbyl group having from 1 to 8 carbon atoms.

14. The engine oil composition of claim 12, wherein the one or more alcohols contain a hydrocarbyl group having from 1 to 8 carbon atoms and one or more heteroatoms.

15. An engine oil composition comprising greater than 50 wt% base oil selected from a Group II, Group III, Group IV and Group V base oil and mixtures thereof, wherein the Group II and Group III base oils have at least 90% saturates, and

an additive package, wherein the additive package comprises one or more amide or ester reaction products of:

one or more compounds of the formula IV:



(IV)

wherein R is a linear or branched, saturated, unsaturated, or partially saturated hydrocarbyl group about 8 to 22 carbon atoms, and

one or more amine alcohol(s);

wherein the engine oil composition is adapted for use as a crankcase engine oil lubricant suitable for lubrication of valve systems and top and bottom dead centers of pistons/cylinder linear contact zones, the engine oil composition has a phosphorus content of 50-1000 ppm, and the engine oil composition comprises 0.1-2.0 wt. % of the one or more amide or ester reaction products, based on the total weight of the engine oil composition.

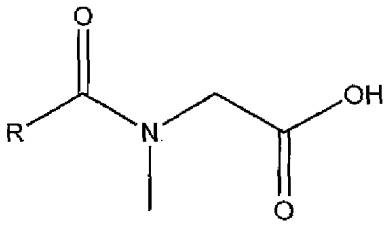
16. The engine oil composition as claimed in claim 15, wherein said amine alcohols are selected from ethanolamine, diethanolamine, aminoethyl ethanolamine, tris-hydroxymethyl amino-methane (THAM), and mixtures thereof.

17. An engine oil composition comprising greater than 50 wt% of base oil selected from a Group II, Group III, Group IV and Group V base oil and mixtures thereof, wherein the Group II and Group III base oils have at least 90% saturates, and

wherein the engine oil composition is adapted for use as a crankcase engine oil lubricant suitable for lubrication of valve systems and top and bottom dead centers of pistons/cylinder linear contact zones, the engine oil composition has a phosphorus content of 50-1000 ppm, and the engine oil composition comprises 0.1-2.0 wt. % of a combination of the one or more reaction products (A) and the at least one compound (B), based on the total weight of the engine oil composition.

18. An engine oil composition comprising greater than 50 wt% of base oil selected from a Group II, Group III, Group IV and Group V base oil and mixtures thereof, wherein the Group II and Group III base oils have at least 90% saturates and an additive package, wherein the additive package comprises

(A) one or more compounds of the formula IV:



(IV)

wherein R is a linear or branched, saturated, unsaturated, or partially saturated hydrocarbyl group having 8 to 22 carbon atoms;

wherein the engine oil composition is adapted for use as a crankcase engine oil lubricant suitable for lubrication of valve systems and top and bottom dead centers of pistons/cylinder linear contact zones, the engine oil composition has a phosphorus content of 50-1000 ppm, and the engine oil composition comprises 0.1-2.0 wt. % of a combination of the one or compounds (A) and the at least one compound (B) that is different from the one or more compounds (A), based on the total weight of the engine oil composition.

19. The engine oil composition of any one of claims 1-18, wherein R has from 10 to 20 carbon atoms.

20. The engine oil composition of any one of claims 1-18, wherein R has from 12 to 18 carbon atoms.

21. The engine oil composition of any one of claims 1-20, wherein the additive package further comprises at least one additive selected from the group consisting of antioxidants, antifoam agents, molybdenum-containing compounds, titanium-containing compounds, phosphorus-containing compounds, viscosity index improvers, pour point depressants, and diluent oils.

22. A method for reducing thin film and boundary layer friction in an engine comprising the step of lubricating the engine with the engine oil composition as claimed in claim 1.

23. The method as claimed in claim 22, wherein the reduced thin film and boundary layer friction is determined relative to a same composition in the absence of the one or more friction modifier components.

24. A method for reducing boundary layer friction in an engine, comprising the step of lubricating the engine with the engine oil composition as claimed in claim 1.

25. The method as claimed in claim 24, wherein the reduced boundary layer friction is determined relative to a same composition in the absence of the one or more friction modifier components.

26. A method for reducing thin film friction in an engine, comprising the step of lubricating the engine with the engine oil composition as claimed in claim 1.

27. The method as claimed in claim 26, wherein the reduced thin film friction is determined relative to a same composition in the absence of the one or more friction modifier components.

28. The engine oil composition of any one of claims 1-21, wherein the base oil is at least one selected from the group consisting of a mineral oil, animal oil, and synthetic oil.