CLAIMS

1. A lubricant composition effective to reduce engine sludge, the lubricant composition comprising

a base oil of lubricating viscosity;

nitrogen provided by a dispersant system and an antioxidant system;

about 1 to about 8 weight percent of the dispersant system including a first hydrocarbyl substituted succinimide dispersant obtainable by reacting a hydrocarbyl substituted acylating agent with a nitrogen source wherein the hydrocarbyl substituent of the first dispersant has a number average molecular weight of at least about 1900 and a second hydrocarbyl substituted succinimide dispersant obtainable by reacting a hydrocarbyl substituted acylating agent with a nitrogen source wherein the hydrocarbyl substituent of the second dispersant has a number average molecular weight less than 1900;

about 0.3 to about 4 weight percent of the antioxidant system including at least an alkylated diphenyl aminic antioxidant and a hindered phenolic antioxidant;

a weight ratio of nitrogen provided by the dispersant system to total nitrogen in the lubricant composition of about 0.6:1 to about 0.8:1;

at least about 75% of the nitrogen provided by the dispersant system is a primary or secondary nitrogen and not post-reacted;

a weight ratio of nitrogen provided by the aminic antioxidant of the antioxidant system to the total nitrogen in the lubricant composition of about 0.15:1 to about 0.4:1;

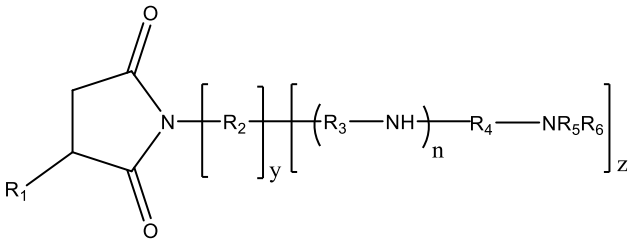
a weight ratio of nitrogen provided by the dispersant system to nitrogen provided by the aminic antioxidant of about 1.8:1 to about 5.3:1; and

wherein the lubricant composition exhibits an average engine sludge of about 7 to about 10 merits pursuant to CEC L-107-19.

2. The lubricant composition of claim 1, further including a phosphorus source including one or more phosphorus-containing compounds independently selected from a thiophosphate, a dithiophosphate, a metal phosphate, a metal thiophosphate, a metal di-thiophosphate, a phosphate, a phosphite, a phosphonate, salts thereof, and mixtures thereof.

3. The lubricant composition of claim 1, further including a detergent system including at least one metal containing detergent providing up to about 3500 ppm metal to the composition and having a combined total base number of 0 to about 500.

4. The lubricant composition of claim 1, wherein each of the hydrocarbyl substituted succinimide dispersants of the dispersant system has a structure of Formula I:



(Formula I);

wherein

R_1 of the first dispersant is a hydrocarbyl group having a number average molecular weight of about 1900 to about 5,000 and R_1 of the second dispersant is a hydrocarbyl group having a number average molecular weight of about 350 to about 1900;

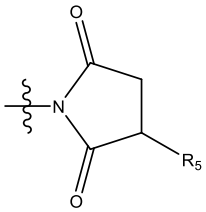
R_2, R_3, and R_4 are independently divalent C_1-C_6 moieties;

each of R_5 and R_6, independently, is hydrogen, a C_1-C_6 alkyl group, or together with the nitrogen to which they are attached form a 5- or 6-membered ring optionally fused with one or more aromatic or non-aromatic rings;

n is an integer from 0 to 8; and

y and z are each integers and wherein y + z = 1.

5. The lubricant composition of claim 4, wherein R_5 and R_6 together with the nitrogen to which they are attached form a radical of Formula II



(Formula II).

6. The lubricant composition of claim 1, wherein the hydrocarbyl substituted acylating agent is maleic anhydride; and the nitrogen source is a polyalkylene polyamine

selected from a mixture of polyethylene polyamines having an average of 5 nitrogen atoms, diethylene triamine, triethylene tetramine, tetraethylene pentamine, pentaethylene hexamine, or combinations thereof.

7. The lubricant composition of claim 6, wherein only one of the hydrocarbyl substituted succinimide dispersants is post-treated with a boron source and/or maleic anhydride.

8. The lubricant composition of claim 7, wherein the dispersant system includes about 2 to about 4 times more of the non-post treated dispersant than the post-treated dispersant.

9. The lubricant composition of claim 7, wherein the dispersant systems provides no more than about 300 ppm of total boron to the lubricant composition.

10. The lubricant composition of claim 2, wherein the phosphorus source is present in an amount to provide about up to about 900 ppm of phosphorus to the lubricating composition.

11. The lubricant composition of claim 2, wherein the one or more phosphorus-containing compounds is independently selected from a metal phosphate, a metal thiophosphate, a metal dithiophosphate, or combinations thereof.

12. The lubricant composition of claim 11, wherein the one or more phosphorus-containing compounds is a metal dithiophosphate and includes 12 to 32 total carbon atoms within alkyl groups thereon, wherein each of the alkyl groups independently averages 3 to 8 carbon atoms.

13. The lubricant composition of claim 11, wherein the one or more phosphorus-containing compounds include a first metal dithiophosphate with the alkyl groups derived from secondary alcohols and a second metal dithiophosphate with the alkyl groups derived from primary alcohols.

14. The lubricant composition of claim 11, wherein the metal of the one or more phosphorus-containing compounds is independently selected from the group consisting of aluminum, lead, tin, molybdenum, manganese, nickel, copper, titanium, tungsten, zirconium, or zinc.

15. The lubricant composition of claim 3, wherein the detergent systems include one or more metal containing phenates, sulfur-containing phenates, sulfonates, calixarates, salixarates, salicylates, carboxylic acids, phosphorus acids, mono- and/or di-thiophosphoric acids, alkyl phenols, sulfur coupled alkyl phenol compounds, methylene bridged phenols, or combinations thereof.