CLAIMS

WHAT IS CLAIMED IS

1. A lubricating composition for reducing high temperature deposits, the lubricating composition comprising:

one or more base oils of lubricating viscosity;

a detergent system providing an amount of metal to the lubricating composition, where the metal is at least one of sodium, calcium, magnesium, or combinations thereof, wherein the detergent system includes about 55 to about 75 weight percent of a detergent additive providing calcium and about 25 to about 45 weight percent of a detergent additive providing magnesium;

an antiwear system including one or more metal dialkyl dithiophosphates derived from one of primary alcohols, secondary alcohols, or combinations thereof and providing an amount of phosphorus to the lubricating composition;

wherein a total base number (TBN) of the lubricating composition is from about 0.5 to about 20;

wherein a ratio of phosphorus from the antiwear system relative to the TBN of the lubricating composition is about 150 or less;

wherein the lubricating composition includes a total amount of metal such that the composition has no more than about 0.8 weight percent of calculated sulfated ash; and

wherein the lubricating composition has less than about 30 mg of deposits when subjected to the high temperature deposit formation test of ASTM D6335.

2. The lubricating composition of claim 1, wherein the ratio of phosphorus from the antiwear system relative to the TBN is about 120 or less; and/or wherein a ratio of phosphorus from the antiwear system relative to the amount of metal from the detergent system is about 0.5 or less.

3. The lubricating composition of claim 2, wherein the lubricating composition includes no more than about 800 ppm of phosphorus from the antiwear system.

4. The lubricating composition of claim 3, wherein the lubricating composition includes no more than about 1800 ppm of metal from the detergent system.

5. The lubricating composition of claim 1, wherein the detergent system provides about 10 to about 1500 ppm of calcium and about 10 to about 500 ppm magnesium.

6. The lubricating composition of claim 1, wherein the antiwear system includes two metal dialkyl dithiophosphates; and/or wherein a first zinc dialkyl dithiophosphate is derived from primary alcohols and a second zinc dialkyl dithiophosphate is derived from secondary alcohols.

7. The lubricating composition of claim 6, wherein the antiwear system includes a majority of the second zinc dialkyl dithiophosphate derived from secondary alcohols; and/or wherein the antiwear system includes about 20 to about 30 weight percent of the first zinc dialkyl dithiophosphate derived from primary alcohols and about 70 to about 80 weight percent of the second zinc dialkyl dithiophosphate derived from secondary alcohols.

8. The lubricating composition of claim 1, wherein the detergent system includes a calcium sulfonate, calcium phenate, or combination thereof having a total base number of 200 to 500; and/or wherein detergent system includes a magnesium sulfonate, magnesium phenate, or combination thereof having a total base number of 200 to about 500; and/or wherein the total base number of the lubricating composition is less than about 10.

9. The lubricating composition of claim 1, further comprising an amount of zinc provided by the antiwear system and wherein an amount of zinc from the antiwear system relative to the amount of total metals from the detergent system is about 0.6 or less; and/or wherein the antiwear system provides about 50 to about 850 ppm of zinc to the lubricating composition.

10. A low ash lubricating composition for reducing high temperature deposits, the lubricating composition comprising:

one or more base oils of lubricating viscosity;

a detergent system providing an amount of metal to the lubricant composition, where the metal is at least one of sodium, calcium, magnesium, or combinations thereof, wherein the detergent system includes about 55 to about 75 weight percent of a detergent additive providing calcium and about 25 to about 45 weight percent of a detergent additive providing magnesium;

an antiwear system including one or more metal dialkyl dithiophosphates derived from one of primary alcohols, secondary alcohols, or combinations thereof and providing an amount of phosphorus to the lubricating composition;

wherein a ratio of phosphorus from the antiwear system relative to the amount of metal from the detergent system is about 0.5 or less;

wherein the lubricating composition includes a total amount of metal such that the composition has no more than about 0.8 weight percent of calculated sulfated ash; and

wherein the lubricating composition has less than about 30 mg of deposits when subjected to the high temperature deposit formation test of ASTM D6335.

11. The low ash lubricating composition of claim 10, wherein the lubricating composition includes no more than about 800 ppm of phosphorus from the antiwear system and no more than about 1800 ppm of metal from the detergent system.

12. A method of lubricating an engine with a lubricating composition that meets API SP/ILSAC GF-6 standards, the method comprising

lubricating the engine with a lubricating composition, the lubricating composition including one or more base oils of lubricating viscosity; a detergent system providing an amount of metal to the lubricant composition, where the metal is at least one of sodium, calcium, magnesium, or combinations thereof, wherein the detergent system includes about 55 to about 75 weight percent of a detergent additive providing calcium and about 25 to about 45 weight percent of a detergent additive providing magnesium; an antiwear system including one or more metal dialkyl dithiophosphates derived from one of primary alcohol, secondary alcohol, or combinations thereof and providing an amount of phosphorus to the lubricating composition; wherein a total base number (TBN) of the lubricating composition is from about 0.5 to about 20; and wherein a ratio of phosphorus from the antiwear system relative to the TBN of the lubricating composition is about 150 or less; and

wherein the lubricating composition has a total amount of metals such that the lubricating composition has no more than about 0.8 weight percent of calculated sulfated ash and less than about 30 mg of deposits when subjected to the high temperature deposit formation test of ASTM D6335.

13. The method of claim 12, wherein the lubricating composition includes no more than about 800 ppm of phosphorus from the antiwear system; and/or wherein the lubricating composition includes no more than about 1800 ppm of total metals from the detergent system; and/or wherein the detergent system provides about 10 to about 1500 ppm of calcium and about 10 to about 500 ppm magnesium.

14. The method of claim 12, wherein the antiwear system provides about 50 to about 850 ppm zinc to the lubricating composition and wherein an amount of zinc from the antiwear system relative to the amount of total metals from the detergent system is about 0.6 or less.