CLAIMS

What is claimed is:

1. A booster additive package for a passenger car motor oil lubricating composition suitable for improving at least one of deposits, sludge, wear, TBN, and rust protection, the booster additive package comprising:

one or more oil soluble nitrogen-containing compounds providing about 1000 ppm to about 8500 ppm of nitrogen to the booster additive package;

one or more detergent additives providing about 0.2 weight percent to about 5 weight percent soap to the booster additive package;

wherein the booster additive package is configured, upon addition to a fresh and/or used passenger car motor oil composition, to maintain API SP and/or GF-6 certifications; and

wherein, when the booster additive package is added to a passenger car motor oil lubricating composition, the combination of the passenger car motor oil lubricating composition and the booster additive package are licensable with the American Petroleum Institute (API) and/or the International Lubricant Standardization and Approval committee (ILSAC).

2. The booster additive package of claim 1, wherein at least about 90 weight percent of the detergent soap is provided by the one or more detergent additives having a total base number (TBN) of about 250 mg KOH/g or more.

3. The booster additive package of claim 2, wherein the one or more detergent additives include only a magnesium-containing detergent additive.

4. The booster additive package of claim 1, wherein the one or more detergent additives contribute a total base number (TBN) to the booster additive package of about 5 mg KOH/g to about 40 mg KOH/g as measured pursuant to ASTM D2896, and/or wherein a TBN/ounce of the booster additive package is about 0.5 to about 16 mg KOH/g per ounce of the booster additive package.

5. The booster additive package of claim 4, wherein about 65 to about 100 percent of the detergent TBN is provided by one or more magnesium-containing detergent additives.

6. The booster additive package of claim 5, wherein the booster additive package includes about 1000 ppm to about 10,000 ppm of magnesium from a magnesium-containing detergent and/or wherein the booster additive package includes about 100 ppm of magnesium/ounce of the booster additive package to about 5000 ppm of magnesium/ounce of the booster additive package.

7. The booster additive package of claim 1, wherein the oil soluble nitrogen-containing compound incudes an aminic antioxidant.

8. The booster additive package of claim 7, wherein the oil soluble nitrogen-containing compound is an aminic antioxidant selected from the group comprising aromatic amines, alkylated diphenyl amines, alkyl diphenylamine, di-alkyl diphenylamine, octyl diphenylamine, di-octyl diphenylamine, phenyl-alpha-naphthylamines, alkylated phenyl-alpha-naphthylamines, hindered non-aromatic amines, or combinations thereof.

9. The booster additive package of claim 1, wherein the booster additive package includes one or more aminic antioxidants providing about 1000 ppm to about 6000 ppm of antioxidant nitrogen and/or wherein the booster additive package has about 100 ppm of antioxidant nitrogen per ounce of the booster additive package to about 3000 ppm of antioxidant nitrogen per ounce of the booster additive package.

10. The booster additive package of claim 1, wherein a ratio of detergent total base number (TBN) to detergent total soap content is about 10:1 to about 15:1.

11. The booster additive package of claim 1, wherein about 90 to about 100 percent of the nitrogen is provided by an aminic antioxidant.

12. The booster additive package of claim 11, wherein the booster additive package further includes one or more ashless dispersants obtainable by reacting a hydrocarbyl substituted acylating agent with a nitrogen source.

13. The booster additive package of claim 12, wherein the ashless dispersant is post-treated with one or more of boron, carboxylic acids or derivatives thereof, and combinations thereof.

14. The booster additive package of claim 12, wherein the booster additive packaging includes about 400 to about 2500 ppm of dispersant nitrogen provided by the one or more ashless dispersants and/or wherein the booster additive package includes about 40 ppm of dispersant nitrogen per ounce of the booster additive package to about 1300 ppm of dispersant nitrogen per ounce of the booster additive package.

15. The booster additive package of claim 1, wherein the booster additive package further includes a calcium-containing detergent additive.

16. The booster additive package of claim 15, wherein the booster additive package further includes about 900 ppm to about 5,000 ppm of calcium from the calcium-containing detergent additive and/or wherein the booster additive package includes about 90 ppm of detergent calcium per ounce of the booster additive package to about 2,500 ppm of detergent calcium per ounce of the booster additive package.

17. A lubricating composition suitable for improving at least one deposits, sludge, wear, TBN retention, and rust protection, the lubricating composition comprising:

(a) a fresh or used passenger car motor oil lubricating composition including (i) one or more base oils of lubricating viscosity; (ii) a dispersant inhibitor additive package; and (iii) optionally, a viscosity index improver; and

(b) the booster additive package of claim 1.

18. The lubricating composition of claim 17, wherein the booster additive package is added in an amount effective to provide one or more of (a) increasing the total nitrogen content by at least about 5% relative to the passenger car motor oil lubricating composition; (b) increasing the magnesium content by at least about 20% relative to the passenger car motor oil lubricating composition; (c) increasing the magnesium soap content by at least about 20 % relative to the passenger car motor oil lubricating composition; or (d) combination thereof.

19. The lubricating composition of claim 17, wherein the lubricating composition has at least one of (a) about 450 ppm to about 550 ppm of magnesium provided from the passenger car motor oil lubricating composition and the booster additive package combined; (b) about 700 to about 1200 ppm of total nitrogen provided from the passenger car motor oil lubricating composition and the booster additive package combined; (c) about 0.5 to about 1.0 weight percent of soap content from the passenger car motor oil lubricating composition and the booster additive package combined; or (d) combination thereof.

20. The lubricating composition of claim 17, wherein the lubricating composition exhibits a higher rust protection for up to about 6000 miles of lubrication when measured pursuant to ASTM D6557 as compared to a baseline lubricating composition with the passenger car motor oil composition but without the booster additive package and/or wherein the passenger car motor oil composition is one of a fresh passenger car motor oil competitions or a used passenger car motor oil composition.

21. The lubricating composition of claim 17, wherein the lubricating composition includes about 1 to about 10 weight percent of the booster additive package.

22. A method for providing rust protection to a valve train component of a passenger car engine with a lubricating composition, the method comprising

providing a passenger car motor oil lubricating composition including one or more detergent additives providing up to about 0.5 weight percent soap to the passenger car motor oil lubricating composition and one or more oil-soluble nitrogen containing compounds providing up to about 600 ppm dispersant nitrogen to the passenger car motor oil lubricating composition;

adding a booster additive package to the passenger car motor oil lubricating composition to form the lubricating composition; and

wherein the lubricating composition maintains a higher level of rust protection to the valve train components than a lubricating composition including the passenger car motor oil lubricating composition but without the booster additive package.

23. The method for providing rust protection of claim 22, wherein the lubricating composition is described in claim 17.

24. The method for providing rust protection of claim 22, wherein the booster additive package is described in claim 1.

25. The method for providing rust protection of claim 22, wherein the booster additive package is added in an amount effective to provide one or more of (a) increasing the total nitrogen content by at least about 5% relative to the passenger car motor oil lubricating composition; (b) increasing the magnesium content by at least about 20% relative to the passenger car motor oil lubricating composition; (c) increasing the magnesium soap content by at least about 20 % relative to the passenger car motor oil lubricating composition; or (d) combination thereof.