

What is claimed is:

1. A lubricating oil composition comprising:
 - a) greater than 50 wt.% of a base oil of lubricating viscosity, based on the total weight of the lubricating oil composition;
 - b) an amount of one or more calcium-containing detergents to provide less than 1700 ppm calcium, based on a total weight of the lubricating oil composition
 - c) an amount of one or more magnesium-containing detergents to provide less than 450 ppm magnesium, based on the total weight of the lubricating oil composition;
 - d) an amount of one or more molybdenum-containing compounds to provide less than 450 ppm molybdenum, based on the total weight of the lubricating oil composition;
 - e) from about 700 ppm to about 900 ppm of phosphorus, based on the total weight of the lubricating oil composition; and
 - f) a total measured sulfated ash content of no greater than 1.0 wt.%, as measured by ASTM D874, based on the total weight of the lubricating oil composition; and a ratio, in ppm, of calcium from the one or more calcium-containing detergents to magnesium from the one or more magnesium-containing detergents of 1:1 or more.
2. The lubricating oil composition of claim 1, wherein the lubricating oil composition provides a diesel particulate filter delta pressure (ΔP) vs. oil consumption result of 0.6 kPa/kg or less, 0.5 kPa/kg or less or 0.45 kPa/kg or less, as measured in a VW PV 1485 test after 144 hours.
3. The lubricating oil composition of claim 1, wherein the lubricating oil composition is effective to reduce low speed pre-ignition events in a boosted internal combustion engine lubricated with the lubricating oil composition relative to a number of low speed pre-ignition events in the same engine lubricated with reference lubricating oil R-1; or the reduction of LSPI events is 50% or greater reduction and the LSPI events are LSPI counts during 25,000 engine cycles, wherein the engine is operated at 2000 revolutions per minute with brake mean effective pressure of 1,800 kPa.

4. The lubricating oil composition of any one of claims 1-3, wherein the one or more magnesium-containing detergents provides 410 ppm or less of magnesium, based on a total weight of the lubricating oil composition
5. The lubricating oil composition of any one of claims 1-4, wherein the ratio of total calcium from the one or more calcium-containing detergents in ppm to total magnesium from the one or more magnesium-containing detergents is more than 2.5; or more than 3.5.
6. The lubricating oil composition of any one of claims 1-5, wherein the one or more calcium-containing detergents is overbased having a total base number of greater than 225 mg KOH/g; or 250 mg KOH/g or more as measured by the method of ASTM D-2896.
7. The lubricating oil composition of any one of claims 1-6, wherein the one or more calcium-containing detergents is present in an amount sufficient to provide less than 1670 ppm calcium; or less than 1500 ppm calcium; or less than 1400 ppm calcium; or more than 1350 ppm to less than 1700 ppm calcium to the total weight of the lubricating oil composition.
8. The lubricating oil composition of any one of claims 1-7, wherein the total sulfated ash content is less than 0.8 wt.%, or more than 0.6 wt.% to less than 1.0 wt.%, each as measured by ASTM D874.
9. The lubricating oil composition of any one of claims 1-8, wherein the one or more calcium-containing detergents having a total base number of up to 175 mg KOH/g as measured by the method of ASTM D-2896, if present, provides less than 50 ppm of calcium, or less than 20 ppm of calcium; or less than 5 ppm of calcium; or about 0 ppm of calcium to the total weight of the lubricating oil composition.
10. The lubricating oil composition of any one of claims 1-9, wherein the lubricating oil composition contains less than 100 ppm of boron; or less than 50 ppm of boron; or less than 10 ppm of boron; or about 0 ppm of boron, based on a total weight of the

lubricating oil composition.

11. The lubricating oil composition of any one of claims 1-10, wherein the lubricating oil composition has more than 0 ppm of boron and a ratio of total metal in ppm to total boron in ppm is more than 7.5; or more than 50; or more than 500.
12. The lubricating oil composition of any one of claims 1-11, wherein the one or more magnesium-containing detergents is overbased having a total base number of greater than 225 mg KOH/g; or greater than 250 mg KOH/g or more; or greater than 400 mg KOH/g or more as measured by the method of ASTM D-2896.
13. The lubricating oil composition of any one of claims 1-12, wherein the one or more calcium-containing detergents optionally excludes a calcium salicylate detergent.
14. The lubricating oil composition of any one of claims 1-13, wherein the one or more magnesium-containing detergents is an overbased magnesium sulfonate detergent having a total base number of greater than 225 mg KOH/g, as measured by the method of ASTM D-2896.
15. The lubricating oil composition, of any one of claims 1-14, wherein the lubricating oil composition is an engine oil composition.
16. A method for reducing clogging in a diesel particulate filter comprising a step of operating an engine equipped with a diesel particulate filter and lubricated with a lubricating oil composition comprising:
 - a) greater than 50 wt.% of a base oil of lubricating viscosity, based on the total weight of the lubricating oil composition;
 - b) an amount of one or more calcium-containing detergents to provide less than 1700 ppm calcium, based on a total weight of the lubricating oil composition;
 - c) an amount of one or more magnesium-containing detergents to provide less than 450 ppm magnesium, based on the total weight of the lubricating oil composition;
 - d) an amount of one or more molybdenum-containing compounds to provide less than 450 ppm molybdenum, based on the total weight of the lubricating oil composition;

- e) from about 700 ppm to about 900 ppm of phosphorus, based on the total weight of the lubricating oil composition; and
 - f) a total sulfated ash content of no less than 0.5 wt.% and no greater than 1.0 wt.%, as measured by ASTM D874, based on a total weight of the lubricating oil composition; and
 - a ratio, in ppm, of calcium from the one or more calcium-containing detergents to magnesium from the one or more magnesium-containing detergents of 1:1 or more.
17. The method of claim 16, wherein the lubricating oil composition provides a diesel particulate filter delta pressure (ΔP) versus oil consumption result of 0.6 kPa/kg or less, 0.5 kPa/kg or less, or 0.45 kPa/kg or less, as measured in a VW PV 1485 test after 144 hours.
18. The method of claim 16, wherein the method is effective to reduce low speed pre-ignition events in a boosted internal combustion engine lubricated with the lubricating oil composition relative to a number of low speed pre-ignition events in the same engine lubricated with reference lubricating oil R-1; or the reduction of LSPI events is 50% or greater reduction and the LSPI events are LSPI counts during 25,000 engine cycles, wherein the engine is operated at 2000 revolutions per minute with brake mean effective pressure of 1,800 kPa.
19. The method of any one of claims 16-18, wherein the one or more magnesium-containing detergents provides 410 ppm or less of magnesium, based on a total weight of the lubricating oil composition.
20. The method of any one of claims 16-19, wherein the ratio of total calcium from the one or more calcium-containing detergents in ppm to total magnesium from the one or more magnesium-containing detergents is more than 2.5; or more than 3.5.
21. The method of any one of claims 16-20, wherein the one or more calcium-containing detergents is overbased having a total base number of greater than 225 mg KOH/g; or greater than 250 mg KOH/g or more as measured by the method of ASTM D-2896.

22. The method of any one of claims 16-21, wherein the one or more calcium-containing detergents is present in an amount sufficient to provide less than 1670 ppm calcium; or less than 1500 ppm calcium; or less than 1400 ppm calcium; or more than 1350 ppm to less than 1700 ppm calcium to the total weight of the lubricating oil composition.
23. The method of any one of claims 16-22, wherein the total sulfated ash content is less than 0.8 wt.%, or more than 0.5 wt.% to less than 1.0 wt.%, or more than 0.6 wt.% to less than 1.0 wt.%, each as measured by ASTM D874.
24. The method of any one of claims 16-23, wherein the one or more calcium-containing detergents having a total base number of up to 175 mg KOH/g as measured by the method of ASTM D-2896, if present, provides less than 50 ppm of calcium, or less than 20 ppm of calcium; or less than 5 ppm of calcium; or about 0 ppm of calcium to the total weight of the lubricating oil composition.
25. The method of any one of claims 16-24, wherein the lubricating oil composition contains less than 100 ppm of boron; or less than 50 ppm of boron; or less than 10 ppm of boron; or about 0 ppm of boron, based on a total weight of the lubricating oil composition.
26. The method of any one of claims 16-25, wherein the lubricating oil composition has more than 0 ppm of boron and a ratio of total metal in ppm to total boron in ppm is more than 7.5; or more than 50; or more than 500.
27. The method of any one of claims 16-26, wherein the one or more magnesium-containing detergents is overbased having a total base number of greater than 225 mg KOH/g; or greater than 250 mg KOH/g or more; or greater than 400 mg KOH/g or more as measured by the method of ASTM D-2896.
28. The method of any one of claims 16-27, wherein the one or more calcium-containing detergents exclude a calcium salicylate detergent.

29. The method of any one of claims 16-28, wherein the one or more magnesium-containing detergents is an overbased magnesium sulfonate detergent having a total base number of greater than 225 mg KOH/g.
30. The method of any one of claims 16-29, wherein the lubricating oil composition is an engine oil composition.