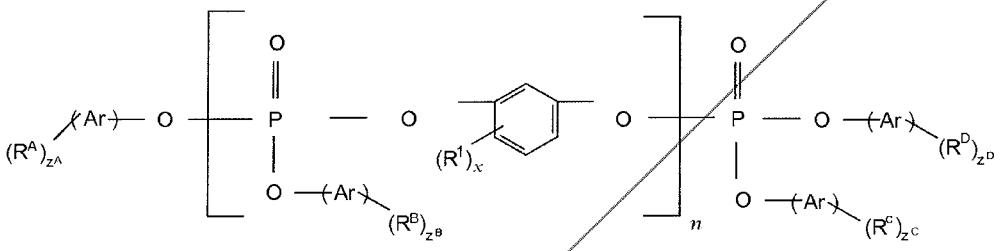
CLAIMS:

1. A turbine oil exhibiting maintained or improved antiwear performance as specified in SAE specification AS 5780 comprising a synthetic ester base oil, one or more of a polymeric aminic antioxidant and RDP antiwear additive of the formula:

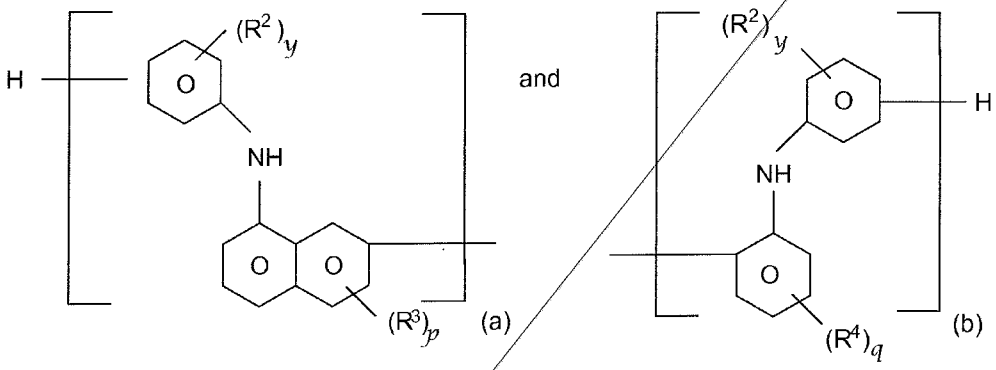


wherein R^1 is a C_1 to C_5 alkyl group, x is an integer ranging from zero to 4, n is an integer ranging from 1 to 7, each Ar is independently phenyl or naphthyl, R^A, R^B, R^C and R^D are the same or different C_1 to C_{18} alkyl groups or hydrogen and where any of R^A to R^D are other than hydrogen the corresponding Z^A, Z^B, Z^C and Z^D are the same or different and range from 1 to up to the available valence of each Ar group, the RDP being present in an amount in the range 0.01 to 10 wt% based on active ingredient and contributing from 500 to 6000 ppm phosphorus, wherein the antiwear performance of the turbine oil as measured by the Wedeven Associates Machine (WAM) test ranges from greater than 23 to 30.

2. The turbine oil of claim 1 wherein the synthetic ester base oil is a diester or a polyolester.

3. The turbine oil of claim 1 wherein the one or more polymeric aminic antioxidants is the polymerized reaction product of one or more diphenyl amines, one or more phenyl naphthyl amines or both one or more diphenyl amines with one or more phenyl naphthyl amines.

4. The turbine oil of claim 3 wherein the one or more polymeric amine antioxidant is the reaction product of:



wherein (a) and (b) each range from zero to 10 provided (a) + (b) is at least 2, R^2 is styrene or a C_1 to C_{30} alkyl, R^3 is styrene or a C_1 to C_{30} alkyl, R^4 is styrene or a C_1 to C_{10} alkyl, p, q and y individually range from zero to up to the valence of the aryl group to which the respective R groups are attached.

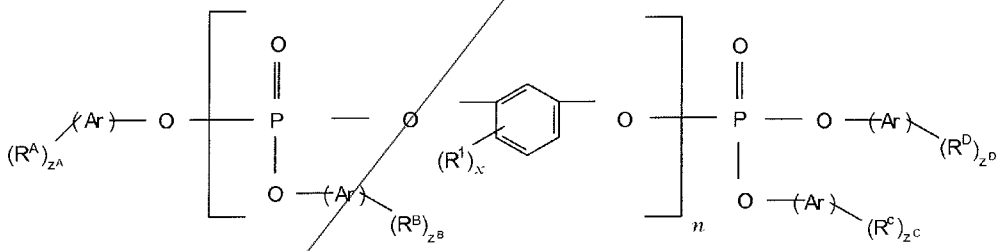
5. The turbine oil of claim 1 wherein in the RDP additive n ranges from zero to 2, R^A, R^B, R^C and R^D are the same or different and are selected from hydrogen and C_1 to C_5 alkyl, and Z^A, Z^B, Z^C and Z^D are the same or different and range from 1 to 2.

6. The turbine oil of claim 5 wherein the RDP is present in an amount in the range 0.1 to 5 wt% based on active ingredient contributing 1000 to 4000 ppm phosphorus.

7. The turbine oil of claim 1, 2, 3, 4, 5 or 6 wherein the polymeric aminic antioxidant is present in an amount in the range 0.5 to 10 wt% based on active ingredient.

8. The turbine oil of claim 1, 2, 3, 4, 5 or 6 further containing additive amounts of corrosion inhibitors, extreme pressure additives, antifoamants, detergents, hydrolytic stabilizers, metal deactivators, rust inhibitors, colorants, odorants, deodorants, viscosity modifiers, viscosity index improvers, phenolic antioxidants and monomeric aminic antioxidants.

9. A method for maintaining or enhancing the antiwear performance of a High Performance Category turbine oil comprising a synthetic ester base oil, one or more of a polymeric aminic antioxidant and RDP antiwear additive of the formula:

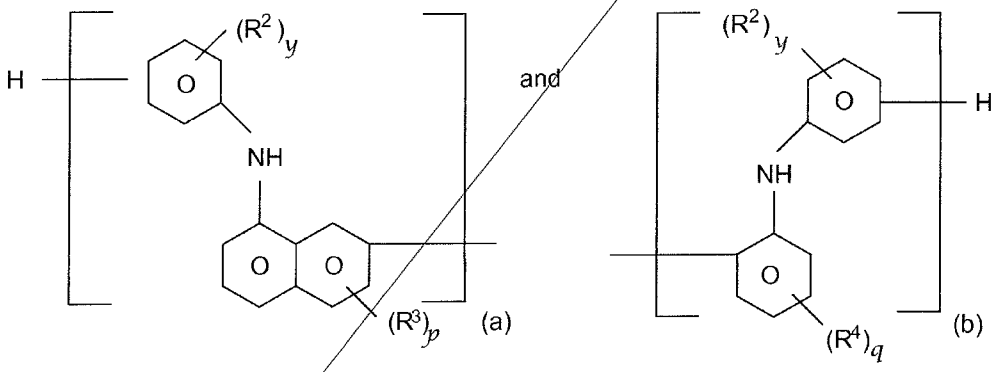


wherein R^1 is a C_1 to C_5 alkyl group, x is an integer ranging from zero to 4, n is an integer ranging from 1 to 7, each Ar is independently phenyl or naphthyl, R^A, R^B, R^C and R^D are the same or different C_1 to C_{18} alkyl groups or hydrogen and where any of R^A to R^D are other than hydrogen the corresponding Z^A, Z^B, Z^C and Z^D are the same or different and range from 1 to up to the available valence of each Ar group, the RDP being present in an amount in the range 0.01 to 10 wt% based on active ingredient and contributing from 500 to 6000 ppm phosphorus, wherein the antiwear performance of the turbine oil as measured by the Wedeven Associates Machine (WAM) test ranges from greater than 23 to 30.

10. The method of claim 9 wherein the synthetic ester base stock is a diester or a polyol ester.

11. The method of claim 9 wherein the one or more polymeric aminic antioxidant is the polymerized reaction product of one or more diphenyl amines, one or more phenyl naphthyl amines or both one or more diphenyl amines with one or more phenyl naphthyl amines.

12. The method of claim 9 wherein the one or more polymeric aminic antioxidants is the reaction product of:



wherein (a) and (b) each range from zero to 10 provided (a) + (b) is at least 2, R^2 is styrene or a C_1 to C_{30} alkyl, R^3 is styrene or a C_1 to C_{30} alkyl, R^4 is styrene or a C_1 to C_{10} alkyl, p, q and y individually range from zero to up to the valence of the aryl group to which the respective R groups are attached.

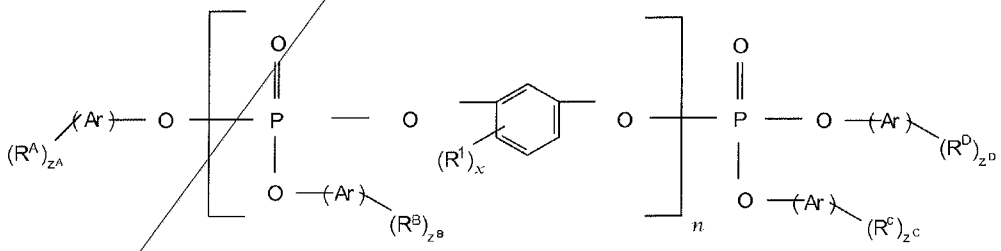
13. The method of claim 9 wherein in the RDP antiwear additive x ranges from zero to 2, R^A, R^B, R^C and R^D are the same or different and are selected from hydrogen and C_1 to C_5 alkyl groups, and Z^A, Z^B, Z^C and Z^D are the same or different and range from 1 to 2.

14. The method of claim 9 wherein the RDP is used in an amount in the range 0.1 to 5 wt% based on active ingredient contributing 1000 to 4000 ppm phosphorus.

15. The method of claim 9, 10, 11, 12, 13 or 14 wherein the polymeric aminic antioxidant is employed in an amount in the range 0.5 to 10 wt% based on active ingredient.

16. The method of claim 9, 10, 11, 12, 13 or 14 wherein the turbine oil further contains additive amounts of corrosion inhibitors, extreme pressure additives, antifoamants, detergents, hydrolytic stabilizers, metal deactivators, rust inhibitors, colorants, odorants, deodorants, viscosity modifiers, viscosity index improvers, phenolic antioxidants and monomeric aminic antioxidants.

17. A method for improving the resistance to deposit formation of turbine oil comprising a synthetic ester base oil, one or more polymeric or monomeric aromatic aminic antioxidants, and RDP antiwear additive of the formula:



wherein R^1 is a C_1 to C_5 alkyl group, x is an integer ranging from zero to 4, n is an integer ranging from 1 to 7, each Ar is independently phenyl or naphthyl, R^A, R^B, R^C and R^D are the same or different C_1 to C_{18} alkyl groups or hydrogen and where any of R^A to R^D are other than hydrogen the corresponding Z^A, Z^B, Z^C and Z^D are the same or different and range from 1 to up to the available valence of

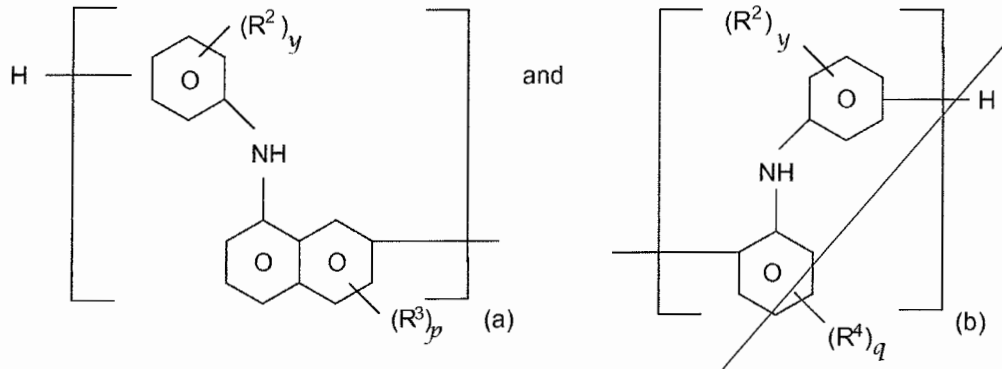
~~each Ar group, the RDP being present in an amount in the range 0.01 to 10 wt%~~ based on active ingredient and contributing from 500 to 6000 ppm phosphorus, wherein the resistance to deposit formation as measured by the Vapor Phase Coker Test at 700° F of the turbine oil is at least 30 mg lower than the deposit formation of turbine oils containing the same ester base stock and aminic antioxidant. but containing tricresyl phosphate in place of the RDP.

18. The method of claim 17 wherein the turbine oil is a Standard Performance Category (SPC) turbine oil wherein the antioxidant is one or more monomeric aminic antioxidants.

19. The method of claim 17 wherein the turbine oil is a High Performance Category (HPC) turbine oil wherein the antioxidant is one or more polymeric aminic antioxidants.

20. The method of claim 19 wherein the one or more polymeric aminic antioxidant is the polymerized reaction product of one or more diphenyl amines, one or more phenyl naphthyl amines or both one or more diphenyl amines with one or more phenyl naphthyl amines.

21. The method of claim 19 wherein the one or more polymeric aminic ~~antioxidants is the reaction product of:~~



wherein (a) and (b) each range from zero to 10 provided (a) + (b) is at least 2, R^2 is styrene or a C_1 to C_{30} alkyl, R^3 is styrene or a C_1 to C_{30} alkyl, R^4 is styrene or a C_1 to C_{10} alkyl, *p*, *q* and *y* individually range from zero to up to the valence of the aryl group to which the respective R groups are attached.

22. The method of claim 17, 18, 19, 20 or 21 wherein in the RDP antiwear additive *x* ranges from zero to 2, R^A, R^B, R^C and R^D are the same or different and are selected from hydrogen and C_1 to C_5 alkyl groups, and Z^A, Z^B, Z^C and Z^D are the same or different and range from 1 to 2.

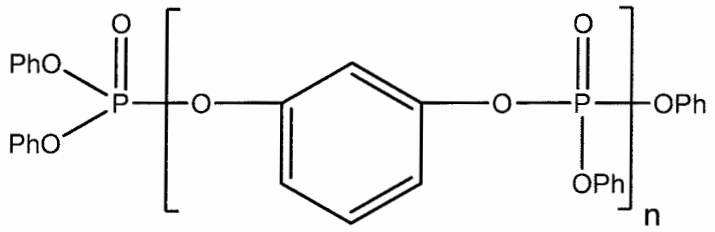
23. The method of claim 17, 18, 19, 20 or 21 wherein the RDP is used in an amount in the range 0.1 to 5 wt% based on active ingredient contributing 1000 to 4000 ppm phosphorus.

24. The method of claim 19, 20 or 21 wherein the polymeric aminic antioxidant is employed in an amount in the range 0.5 to 10 wt% based on active ingredient.

~~25. The method of claim 17, 18, 19, 20 or 21 wherein the synthetic ester~~ is selected from the group consisting of a mixture of monopentaerythritol/dipentaerythritol esters of i-C_5, n-C_5, C_7 and C_9 acids, or a mixture of monopentaerythritol/dipentaerythritol esters of n-C_5, n-C_7, C_8 and C_{10} ~~acids.~~

CLAIMS:

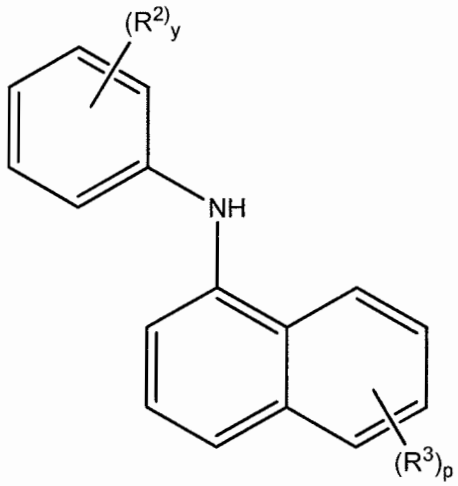
1. A turbine oil exhibiting maintained or improved antiwear performance as specified in SAE specification AS 5780 comprising a synthetic polyol ester base oil, one or more of a polymeric aryl aminic antioxidant and RDP antiwear additive of the formula:



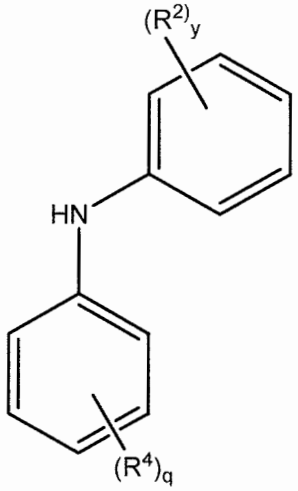
wherein n=1 to 7, Ph is phenyl, the RDP being present in an amount in the range 1 to 2.91 wt% based on active ingredient, wherein the antiwear performance of the turbine oil as measured by the Wedeven Associates Machine (WAM) test ranges from greater than 24 to 30, and wherein the one or more polymeric aryl aminic antioxidant are present in an amount in the range 5.6 to 10 wt% as delivered.

2. The turbine oil of claim 1 wherein the one or more polymeric aryl aminic antioxidants is the polymerized reaction product of one or more diphenyl amines, one or more phenyl naphthyl amines or both one or more diphenyl amines with one or more phenyl naphthyl amines.

3. The turbine oil of claim 2 wherein the one or more polymeric aryl amine antioxidant is the reaction product of:



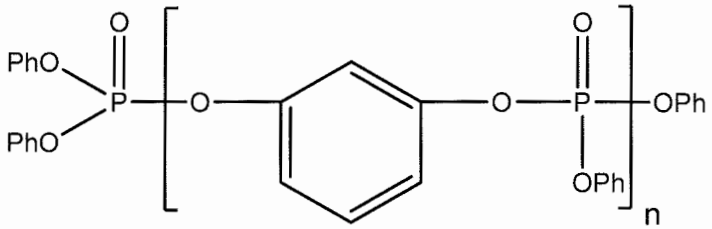
and



wherein R^2 is styrene or a C_1 to C_{30} alkyl, R^3 is styrene or a C_1 to C_{30} alkyl, R^4 is styrene or a C_1 to C_{10} alkyl, p, q and y individually range from zero to up to the valence of the aryl group to which the respective R groups are attached.

4. The turbine oil of claim 1, 2, or 3, further containing additive amounts of corrosion inhibitors, extreme pressure additives, antifoamants, detergents, hydrolytic stabilizers, metal deactivators, rust inhibitors, colorants, odorants, deodorants, viscosity modifiers, viscosity index improvers, phenolic antioxidants and monomeric aminic antioxidants.

5. A method for maintaining or enhancing the antiwear performance of a High Performance Category turbine oil comprising a synthetic polyol ester base oil, one or more of a polymeric aryl aminic antioxidant and RDP antiwear additive of the formula:

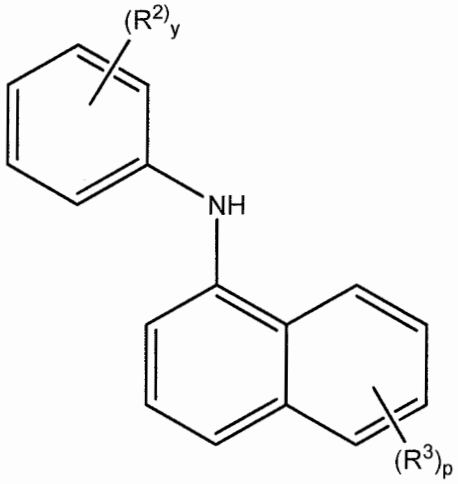


wherein n=1 to 7, Ph is phenyl, the RDP being present in an amount in the range 1 to 2.91 wt% based on active ingredient, wherein the antiwear performance of the turbine

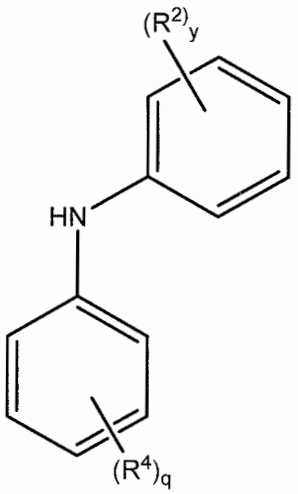
oil as measured by the Wedeven Associates Machine (WAM) test ranges from greater than 24 to 30, and wherein the one or more polymeric aryl aminic antioxidant are present in an amount in the range 5.6 to 10 wt% as delivered.

6. The method of claim 5 wherein the one or more polymeric aryl aminic antioxidant is the polymerized reaction product of one or more diphenyl amines, one or more phenyl naphthyl amines or both one or more diphenyl amines with one or more phenyl naphthyl amines.

7. The method of claim 5 wherein the one or more polymeric aryl aminic antioxidants is the reaction product of:



and



wherein R^2 is styrene or a C_1 to C_{30} alkyl, R^3 is styrene or a C_1 to C_{30} alkyl, R^4 is styrene or a C_1 to C_{10} alkyl, p, q and y individually range from zero to up to the valence of the aryl group to which the respective R groups are attached.

8. The method of claim 5, 6, or 7, wherein the turbine oil further contains additive amounts of corrosion inhibitors, extreme pressure additives, antifoamants, detergents, hydrolytic stabilizers, metal deactivators, rust inhibitors, colorants, odorants, deodorants, viscosity modifiers, viscosity index improvers, phenolic antioxidants and monomeric aminic antioxidants.