

The Claims defining the Invention are as follows:

1. A combustible composition for cleaning fuel delivery systems, air intake systems, and combustion chambers comprising:

at least 10 wt. % of a polyether component, the polyether component being selected from the group consisting of polyethers, polyetheramines, and mixtures thereof;

at least 20 wt. % of a polar solvent, other than an alkoxyalcohol, the polar solvent being selected from the group consisting of aliphatic polar solvents, aromatic polar solvents, and mixtures thereof, the polar solvent comprising an aliphatic polar solvent selected from the group consisting of C₁-C₁₂ aliphatic alcohols, C₁-C₁₂ aliphatic amines, (C₁-C₁₂ alkyl)₂O ethers, and mixtures thereof, the aliphatic polar solvent comprising at least 80 wt. % of the polar solvent;

at least 15 wt. % of a non-polar solvent, the non-polar solvent comprising a non-polar aromatic solvent consisting essentially of aromatic hydrocarbons, the non-polar aromatic solvent being at least 15 wt. % of the composition;

at least 5 wt. % of a functional solvent, other than the polar solvent and non-polar aromatic solvent, the functional solvent comprising an alkoxyalcohol, the alkoxyalcohol being at least 5 wt. % of the composition; and

no more than 10 wt. % water,

wherein the polyether component, polar solvent, and non-polar solvent total at least 70 wt. % of the composition.

2. The composition of claim 1, wherein the polyether component comprises a poly(alkylene oxide)amine.

3. The composition of claim 2, wherein the alkylene oxide in the poly(alkylene oxide)amine is selected from butylene oxide, propylene oxide, and mixtures thereof.

4. The composition of claim 1, wherein the polyether or polyetheramine is represented by the formula $R[OCH_2CH(R^1)]_nA$, where R is a hydrocarbyl group, R¹ is

selected from hydrogen and a hydrocarbyl group, A is a nitrogen-containing group or a hydroxyl group, and n is a number which is at least 2.

5. The composition of claim 4, wherein R is a hydrocarbyl group of 1-30 carbon atoms.

6. The composition of claim 4, wherein n is at least 10.

7. The composition of claim 4, wherein A is selected from the group consisting of amines, ether amines and mixtures thereof.

8. The composition of claim 7, wherein A is selected from $-\text{OCH}_2\text{CH}_2\text{CH}_2\text{NR}^2\text{R}^2$ and $-\text{NR}^3\text{R}^3$, where each R^2 is independently hydrogen or a hydrocarbyl group of one or more carbon atoms, and each R^3 is independently hydrogen, a hydrocarbyl group of one or more carbon atoms, or $-\text{[R}^4(\text{R}^5)]_p\text{R}^6$, where R^4 is a $\text{C}_2\text{-C}_{10}$ alkylene, R^5 and R^6 are independently hydrogen or a hydrocarbyl group of one or more carbon atoms, and p is a number from 1 to 7.

9. The composition of claim 1, wherein at least 20 wt. % of the polyether component is polyetheramine.

10. The composition of claim 1, wherein a ratio, by weight, of the aliphatic polar solvent to the non-polar aromatic solvent in the composition is at least 1:5.

11. The composition of claim 1, wherein the aliphatic polar solvent is selected from the group consisting of branched and unbranched $\text{C}_1\text{-C}_{12}$ aliphatic alcohols, $\text{C}_1\text{-C}_{12}$ aliphatic amines, and mixtures thereof.

12. The composition of claim 1, wherein the non-polar aromatic solvent comprises a hydrocarbon selected from $\text{C}_1\text{-C}_4$ alkyl substituted benzenes and mixtures thereof.

13. The composition of claim 1, wherein the non-polar aromatic solvent has a Hansen solubility parameter of up to 2 MPa^{1/2} and the aliphatic polar solvent has a Hansen solubility parameter of at least 2.8 MPa^{1/2}.

14. The composition of claim 1, wherein in combination, the polyether component, aliphatic polar solvent, and non-polar aromatic solvent are at least 75 wt. % of the composition.

15. The composition of claim 1, wherein the alkoxyalcohol is present in the composition at a concentration of at least 10 wt. %.

16. The composition of claim 1, wherein the alkoxyalcohol comprises 2-butoxy ethanol.

17. The composition of claim 1, wherein the functional solvent has a solubility of at least 10 parts by weight of functional solvent in the aliphatic polar solvent and in the non-polar aromatic solvent.

18. The composition of claim 1, further comprising at least one of a detergent, a dispersant, a corrosion inhibitor and a propellant.

19. The composition of claim 1, wherein the composition comprises at least 0.5 wt. % water.

20. The composition of claim 1, comprising no more than 5 wt. % water.

21. The composition of claim 1, wherein at least 70 wt. % of the polyether component is polyetheramine.

22. The composition of claim 1, wherein the composition comprises 20-40 wt. % non-polar aromatic solvent.

23. The composition of claim 11, wherein the aliphatic polar solvent comprises a C2-C4 aliphatic alcohol.

24. An engine cleaning composition comprising:

15-23 wt. % of a polyether component, the polyether component being selected from the group consisting of polyethers, polyetheramines, and mixtures thereof;

10-30 wt. % of a functional solvent, the functional solvent comprising an alkoxyalcohol selected from the group consisting of butyl glycol, ethoxypropanol, and mixtures thereof, the alkoxyalcohol being at least 10 wt. % of the composition;

20-35 wt. % of an aliphatic polar solvent, other than the functional solvent said aliphatic polar solvent selected from the group consisting of C1-C12 aliphatic alcohols, C1-C12 aliphatic amines, (C1-C12 alkyl)2O ethers, and mixtures thereof; and

20-40 wt. % of a non-polar aromatic solvent wherein the polyether component, aliphatic polar solvent, and non-polar aromatic solvent total at least 70 wt. % of the composition, other than the functional solvent,

wherein the polyether component, polar aliphatic solvent, and non-polar aromatic solvent total at least 70 wt. % of the composition.

25. A method for removing at least one of air intake valve deposits, fuel injector deposits, and combustion chamber deposits in a spark-ignited internal combustion engine, comprising:

delivering a composition according to claim 1 into the engine.