[0010] The cleaning solvent compositions of the present invention generally comprise an effective amount of trans-1,2-dichloroethylene, for example, at least 50 weight percent of the composition, at least about 3.8 weight percent, for example, at least about 4 weight percent heptafluorocyclopentane, up to about 15 weight percent, and at least about 0.5 weight percent, for example, at least about 2 weight percent of methylperfluoroheptane ethers, up to about 15 weight percent.

[0011] More specifically, the cleaning solvent compositions of the present invention comprise from about 70 to about 95.7 weight percent trans-dichloroethylene, from about 15 to about 3.8 weight percent heptafluorocyclopentane, and from about 15 to about 0.5 weight percent of methylperfluoroheptene ethers. Certain embodiments of the present invention comprise from about 88 to about 94.2 weight percent trans-dichloroethylene, from about 6 to about 3.8 weight percent heptafluorocyclopentane, and from about 6 to about 2 weight percent of methylperfluoroheptene ethers. Other embodiments of the present invention comprise a cleaning solvent blend of about 91 to about 92.7%, e.g., about 92%, by weight trans-dichloroethylene, about 4.5 to about 3.8%, e.g., about 4%, by weight heptafluorocyclopentane, and about 4.5 to about 3.5%, e.g., about 4%, by weight methylperfluoroheptene ethers. Still other embodiments of the present invention provide a cleaning solvent blend of about 88 to about 92%, e.g., about 90%, by weight trans-dichloroethylene, about 6 to about 4%, e.g., about 5%, by weight heptafluorocyclopentane, and about 6 to about 4%, e.g., about 5% by weight methylperfluoroheptene ethers.

[0012] Unless otherwise specifically stated, or clear from the context, all percentages of a given component, whether expressed as "%", "wt %", "weight %", "weight percent" or otherwise, are percent by weight of the component in the solvent composition, based on the total weight of the composition.

[0013] As used herein, the term "azeotrope-like" behavior or characteristics or language of similar import used with reference to the cleaning solvent blends of the present invention means that while the solvent blends may not exhibit perfect azeotropic characteristics (although some of the blends of the present invention may do so), the changes in composition after repeated distillation steps are small. Generally, the term "azeotrope-like composition" means a constant boiling, or substantially constant boiling liquid admixture of two or more substances that behaves under distillation as if it were a single substance. That is, the vapor produced by distillation of the liquid has substantially the same composition as the liquid from which it was distilled. Stated otherwise, there is no substantial composition change as the admixture is distilled. Further, an azeotrope-like composition may be characterized as a composition having a boiling point temperature of less than the boiling point of each pure component of the composition.

IN THE CLAIMS

What is claimed is:

1. A solvent composition exhibiting azeotrope-like properties and comprising:
from 70 to 95.7 weight percent trans-dichloroethylene;
from 15 to 3.8 weight percent heptafluorocyclopentane; and
from 15 to 0.5 weight percent methylperfluoroheptene ethers.

2. The solvent composition of claim 1 comprising:
from 88 to 94.2 weight percent trans-dichloroethylene;
from 6 to 3.8 weight percent heptafluorocyclopentane; and
from 6 to 2 weight percent methylperfluoroheptene ethers.

3. The composition of claim 1 comprising:
from 91 to 92.7 weight percent trans-dichloroethylene;
from 4.5 to 3.8 weight percent heptafluorocyclopentane; and
from 4.5 to 3.5 weight percent methylperfluoroheptene ethers.

4. The composition of claim 1 comprising:
from 70 to 95.5 weight percent trans-dichloroethylene;
from 15 to 4 weight percent heptafluorocyclopentane; and
from 15 to 0.5 weight percent methylperfluoroheptene ethers.

5. The composition of claim 1 comprising:
92 weight percent trans-dichloroethylene;
4 weight percent heptafluorocyclopentane; and
4 weight percent methylperfluoroheptene ethers.

6. The composition of claim 1 comprising:
from 88 to 92 weight percent trans-dichloroethylene;
from 6 to 4 weight percent heptafluorocyclopentane; and
from 6 to 4 weight percent methylperfluoroheptene ethers.

7. The composition of claim 1 comprising:
90 weight percent trans-dichloroethylene;
5 weight percent heptafluorocyclopentane; and
5 weight percent methylperfluoroheptene ethers.

8. A method for cleaning soiling substances from metal, ceramic and synthetic polymer articles comprising:

contacting one or more of the articles with a solvent composition having azeotrope-like properties, the composition comprising:

from 70 to 95.7 weight percent trans-dichloroethylene;

from 15 to 3.8 weight percent heptafluorocyclopentane;

from 15 to 0.5 weight percent methylperfluoroheptene ethers; and

removing the composition from the one or more articles.

9. The method of claim 8 wherein the composition comprises:

from 88 to 94.2 weight percent trans-dichloroethylene;

from 6 to 3.8 weight percent heptafluorocyclopentane; and

from 6 to 2 weight percent methylperfluoroheptene ethers.

10. The method of claim 8 wherein the composition comprises:

from 91 to 92.7 weight percent trans-dichloroethylene;

from 4.5 to 3.8 weight percent heptafluorocyclopentane; and

from 4.5 to 3.5 weight percent methylperfluoroheptene ethers.

11. The method of claim 8 wherein the composition comprises:

from 70 to 95.5 weight percent trans-dichloroethylene;

from 15 to 4 weight percent heptafluorocyclopentane; and

from 15 to 0.5 weight percent methylperfluoroheptene ethers.

12. The method of claim 8 wherein the composition comprises:

92 weight percent trans-dichloroethylene;

4 weight percent heptafluorocyclopentane; and

4 weight percent methylperfluoroheptene ethers.

13. The method of claim 8 wherein the composition comprises:

from 88 to 92 weight percent trans-dichloroethylene;

from 6 to 4 weight percent heptafluorocyclopentane; and

from 6 to 4 weight percent methylperfluoroheptene ethers.