Title: LOW-VOC WATER-BASED CLEANER FOR PEN, INK, MARKERS, PAINT

Abstract: A Low-VOC, water-based cleaner containing TKPP Aqueous 60%, EDTA Versene 100, Glycol Ether DPNP, or glycol ether EB and DB, or Just glycol ether EB, Acetone, Acetic Acid, and fragrance. The VOC content of this composition is selectable to be 18.18%, 9.09%, or 0% (zero).
LOW-VOC WATER-BASED CLEANER FOR PEN, INK, MARKERS, PAINT

FIELD OF THE INVENTION

Cleaning compositions to remove from surfaces such as desks, dry erase boards, spray equipment, and furniture deposits and stains such as dry erase marker, nail polish, correction fluid, fountain & bail-point pen, latex paint and wood stain and restore them as closely as possible to a clean condition.

BACKGROUND OF THE INVENTION

Porous surfaces, such as those of carpets, clothing, tablecloths, napkins, automobile seats, athletic shoes, and certain metal and metal composites, to name only few, and hard surfaces such as concrete, stucco, metal signs, tile, wallpaper, vinyls, and wood floors, often receive deleterious deposits and stains. Such deposits vary widely in their identity, for example paints, dry erase markers, permanent marker, latex paint, and wood stain. The term "deposit" includes all of the foregoing, including stains caused by liquids and solids.

The above recitation exemplifies a broad range of materials which need to be cleaned of a broad range of deposits and stains. In response to this need, an equally wide range of cleaning compositions already exists in the market.

Generally speaking, commercial compositions are limited both in the range of their effectiveness, and also as to how efficient they really are for their intended purpose. If one intends to remove a wide range of kinds of
deposits, he is likely to find a nearly-equal number of formulations to buy for the purpose. In addition, some of the stains and deposits are usually only partially removed, and with risk to the material being cleaned. On the consumer market today, for example, there is no known composition which will remove wine from a white tablecloth. This product will.

Furthermore, many existing compositions are objectionable from an environmental standpoint. This composition is water-based, and is environmentally acceptable. It has two low-Volatile Organic Compound (VOC) forms and a zero-VOC form.

It is an object of this invention to provide a water-based environmentally acceptable, biodegradable cleaning composition which can be used to remove a surprisingly wide range of types of deposits and stains. Any residue of these compositions which might remain on the surface, or in the substrate underlying it, will not adversely affect the user or the surface to which it was applied.

BRIEF DESCRIPTION OF THE INVENTION

A composition according to this invention which provides for a wide range of applications is water-based and comprises, in addition to water: TKPP; EDTA (Ethylene diamine tetro acetic acid) and/or phytic acid or a mixture of them; glycol ether DPNP or glycol ether EB and DB; acetone and acetic acid. In this specification, the term glycol EB means ethylene glycol n-butyl ether, and the term EDTA means ethylene diamine tetra acetic acid. By selecting the appropriate components, a range of VOC
numbers can be achieved, at, for example, 18.18% VOC, 9.09% VOC, and zero VOC.

This formulation represents a paradigm shift away from traditional cleaners. All cleaners in the market today clean specified substrates, e.g. tile cleaner, bathroom cleaner, floor cleaner, carpet cleaner, pre-wash; this formulation attacks specific stain types, for ANY substrate. Cleaners in today's market are basically just soap and water. This VOC-compliant formulation works better than non-VOC-formulations in the market, remaining safe for the environment, safe for the individual, and safe for any surface.
DETAILED DESCRIPTION OF THE INVENTION

This product consists essentially of a member of each of the following groups of ingredients:

a. De-ionized water
b. TKPP Aqueous 60%
c. EDTA Versene 100
d. Glycol Ether DPNP, or glycol ether EB and DB, or just glycol ether EB
e. Acetone
f. Acetic Acid
g. fragrance

The proportions of the member or members in each group in the ultimate product are determined by the VOC percentage targeted for the product.

This is a water-based product. Percentages specified herein are in weight percentage of the total composition. However, in mixing the formulations to make the product, it is best practice to dissolve certain of the ingredients in water before adding them into the total formulation. If all of the ingredients are added to the water at one time, occasionally a clear solution might not result. For this reason it is preferred practice to dissolve the TKPP in water before adding the other ingredients.

Similarly, EDTA versene 100 is best supplied not as a dry product, but in a diluted form, about 34% EDTA to about 86% water. This is readily
available in industrial concentration.

The other ingredients are either already liquid or readily dissolved, so as to enter the solution or be miscible with it. No special procedure is necessary as to them.

CAS Numbers

- TKPP Aqueous 60% 7320-34-5
- EDTA Versene 100 60-00-4
- Glycol ether EB and DPNP 111-76-2
- Glycol ether DB 112-34-5
- Acetone 87-84-1
- Acetic acid 64-19-1
- De-ionized water 7732-18-5

In all the formulations and guidelines given below, at least one substance from each group must be included.

18.18% VOC Formulation percentages

a. De-ionized water 39.24
b. Baypure CX 4.18
c. TKPP 1.63
d. De-ionized water 27.77
e. Glycol ether EB 18.18
f. Acetone 8.18
g. Acetic acid 0.32
g. Fragrance 0.50
9.09% VQC formulation percentages

a. De-ionized water 39.24
b. TKPP 1.63
c. EDTA Versene 100 4.18
d. De-ionized water 27.77
e. Glycol ether EB 9.09
  Glycol ether DB 9.09
f. Acetone 8.18
g. Acetic acid 0.32
h. Fragrance 0.50
### Zero VOC formulation percentages - A

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>a. De-ionized water</td>
<td>39.24</td>
</tr>
<tr>
<td>b. TKPP</td>
<td>1.83</td>
</tr>
<tr>
<td>c. EDTA Versene 100</td>
<td>4.18</td>
</tr>
<tr>
<td>d. De-ionized water</td>
<td>27.77</td>
</tr>
<tr>
<td>d. Glycol ether DPNP</td>
<td>18.18</td>
</tr>
<tr>
<td>e. Acetone</td>
<td>8.18</td>
</tr>
<tr>
<td>f. Acetic acid</td>
<td>0.32</td>
</tr>
<tr>
<td>g. Fragrance</td>
<td>0.50</td>
</tr>
</tbody>
</table>

### Zero VOC formulation percentages - B

<table>
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<tr>
<th>Ingredient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. De-ionized water</td>
<td>39.24</td>
</tr>
<tr>
<td>b. TKPP</td>
<td>1.83</td>
</tr>
<tr>
<td>c. EDTA Versene 100</td>
<td>4.18</td>
</tr>
<tr>
<td>d. De-ionized water</td>
<td>27.77</td>
</tr>
<tr>
<td>d. Glycol ether DB</td>
<td>18.18</td>
</tr>
<tr>
<td>e. Acetone</td>
<td>8.18</td>
</tr>
<tr>
<td>f. Acetic acid</td>
<td>0.32</td>
</tr>
<tr>
<td>g. Fragrance</td>
<td>0.50</td>
</tr>
</tbody>
</table>
Zero VQC formulation percentages - C

a. De-ionized water 39.24
b. TKPP 1.63
c. EDTA Versene 100 4.18
d. De-ionized water 27.77
d. Glycol ether DPNP 9.09
   Glycol Ether DB 9.09
e. Acetone 8.18
f. Acetic acid 0.32
g. Fragrance 0.50

The preferred embodiment is the first zero VOC formulation, formula A. The other formulations allow flexibility of product during the decrease in acceptable levels of VOCs in household cleaning products.

The combination of components used herein appears to function synergistically, by mechanisms which are not fully understood at this time. What has become apparent is that the total composition functions to a degree of effectiveness much greater than already-known compositions useful for the intended purposes, and that elimination of any of the groups greatly reduces the effectiveness of the composition.

Formulations according to this invention are remarkably versatile and effective for a wide range of deposits and stains on a wide range of substrates. Any residues can readily be removed, so that a clean surface
remains. Any surface or substrate can be laundered or rinsed off to remove any residue.

This invention is not to be limited by the embodiments described in the description, which are given by way of example and not limitation, but only in accordance with the scope of the appended claims.
CLAIMS

I claim

1. A water-based composition for removing stains from substrates, with a VOC level of zero percent, consisting essentially of:
   a. De-ionized water 39.24 percent;
   b. TKPP 1.83 percent;
   c. EDTA Versene 100 4.13 percent;
   d. De-ionized water 27.77 percent;
   d. Glycol ether ΩΡΝΡ 18.18 percent;
   e. Acetone 8.18 percent;
   f. Acetic acid 0.32 percent;
   g. Fragrance 0.502 percent.

2. A water-based composition for removing stains from substrates, with a VOC level of zero percent, consisting essentially of:
   a. De-ionized water 39.24 percent;
   b. TKPP 1.83 percent;
   c. EDTA Versene 100 4.18 percent;
   d. De-ionized water 27.77 percent;
   d. Glycol ether DB 18.18 percent;
   e. Acetone 8.18 percent;
   f. Acetic acid 0.32 percent;
   g. Fragrance 0.502 percent.

3. A water-based composition for removing stains from substrates, with a
VOC level of zero percent, consisting essentially of:

a. De-ionized water 39.24 percent;
b. TKPP 1.83 percent;
c. EDTA Versene 100 4.18 percent;
d. De-ionized water 27.77 percent;
e. Glycol ether DPNP 9.09 percent and Glycol ether DB 9.09 percent;
f. Acetone 8.18 percent;
g. Acetic acid 0.32 percent;
h. Fragrance 0.50 percent.

4. A water-based composition for removing stains from substrates, with a VOC level of 9.09 percent, consisting essentially of:

a. De-ionized water 39.24 percent;
b. TKPP 1.63 percent;
c. EDTA Versene 100 4.18 percent;
d. De-ionized water 27.77 percent;
e. Glycol ether EB 9.09 percent;
   Glycol ether DB 9.09 percent;
f. Acetone 8.18 percent;
g. Acetic acid 0.32 percent;
h. Fragrance 0.50 percent.

5. A water-based composition for removing stains from substrates, with a
VOC level of 18.18 percent, consisting essentially of:

a. De-ionized water 40.87 percent;

b. Baypure CX 4.18 percent;

c. De-ionized water 27.77 percent;

d. Glycol ether EB 18.18 percent;

e. Acetone 8.18 percent;

f. Acetic acid 0.32 percent;

g. Fragrance 0.50 percent.
INTERNATIONAL SEARCH REPORT

PCT/US2014/020733 30.05.2014

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - C09D 9/00; C11D 7/50 (2014.01)

USPC - 510/174, 281, 242

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - C09D 9/00; C11D 7/50 (2014.01)

USPC - 510/174, 281, 242

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)


C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category* Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No.

Y US 5,227,085 A (MOTSENBOCKER, GA) 13 July 1993; abstract; column 5, lines 46-44; claim 1 1-5

Y US 5,871,950 A (HEI, RDP et al.) 16 February 1999; abstract; column 7, table 1; column 9, table 3 1-5

Y US 2009/0032058 A1 (MCRAE, AK et al.) 05 February 2009; abstract; paragraphs [0045], [0059]-[0060] 5


Further documents are listed in the continuation of Box C.

Date of the actual completion of the international search

19 May 2014 (19.05.2014)

Date of mailing of the international search report

30 MAY 2014

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer: Shane Thomas

PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774