Household and Industrial Formulary, No. 922

VAN GEL® Magnesium Aluminum Silicate and VEEGUM® Magnesium Aluminum Silicate comprise Vanderbilt Minerals, LLC’s product line of natural, purified smectite clays. When mixed with water, these clays form opaque, colloidal dispersions. The resulting colloidal structure enhances emulsion stability, suspends abrasives and thickens the formulation. Formulators can prepare cleaners that spread or spray easily, coat evenly and cling to vertical surfaces.

As stabilizing agents and rheology modifiers, VAN GEL and VEEGUM products are effective over a wide pH and temperature range. Whether combined with organic gums, like VANZAN® Xanthan Gum, or used alone, these products provide superior stability, suspending power and pour characteristics. VAN GEL SX is a tailored blend of bentonite clay and xanthan gum.

RECOMMENDED GRADES FOR HOUSEHOLD AND INDUSTRIAL FORMULATIONS

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAN GEL® B</td>
<td>General purpose, most economical grade for a variety of hard surface cleaners and polishes.</td>
</tr>
<tr>
<td>VAN GEL ES</td>
<td>For use in systems containing high levels of dissolved electrolytes.</td>
</tr>
<tr>
<td>VAN GEL O</td>
<td>For use in systems containing sodium hypochlorite.</td>
</tr>
<tr>
<td>VEEGUM® R</td>
<td>General purpose, widely used grade.</td>
</tr>
<tr>
<td>VAN GEL H</td>
<td>General purpose, industrial grade that is particularly useful in high pH formulations.</td>
</tr>
<tr>
<td>VEEGUM T</td>
<td>General purpose, industrial grade that is particularly useful in high pH formulations.</td>
</tr>
<tr>
<td>VAN GEL SX</td>
<td>General purpose, fast hydrating and efficient thickener.</td>
</tr>
</tbody>
</table>

HYDRATION OF VAN GEL AND VEEGUM PRODUCTS

VAN GEL and VEEGUM products must be properly dispersed in water for optimum performance. No other materials should be present in the water because they can interfere with proper hydration and colloidal structure formation. The degree of clay hydration is directly proportional to the amount of energy used to disperse the product. The degree of hydration therefore increases as mixing time, mixing intensity or water temperature increase.
The following table provides suggested minimum hydration times for each of the VAN GEL® and VEEGUM® products. Actual hydration times will depend on the particular combination of batch size, mixer shear, and water temperature used. It is very important that mixing conditions be carefully controlled in order to achieve reproducible results in the final formulation.

<table>
<thead>
<tr>
<th>Water Temp., °C</th>
<th>Mixer Type</th>
<th>Mixer Speed, rpm</th>
<th>Minimum Suggested Mixing Time, Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Propeller</td>
<td>800</td>
<td>VAN GEL® B: 120, VAN GEL® ES: 30, VAN GEL® O: 120</td>
</tr>
<tr>
<td>75</td>
<td>Propeller</td>
<td>45</td>
<td>30, 20, 30</td>
</tr>
<tr>
<td>25</td>
<td>Homogenizer</td>
<td>3000</td>
<td>15, 10</td>
</tr>
<tr>
<td>75</td>
<td>Homogenizer</td>
<td>3000</td>
<td>15, 10</td>
</tr>
</tbody>
</table>

VAN GEL Magnesium Aluminum Silicate, VEEGUM Magnesium Aluminum Silicate and VANZAN Xanthan Gum are registered trademarks of R.T. Vanderbilt Holding Company, Inc. and/or its respective wholly owned subsidiaries.
FORMULARY

GENERAL CLEANERS/CLEANSERS
- Liquid Cleanser No. 531
- Liquid Cleanser No. 580
- Liquid Tile Cleaner No. 396
- Bathroom Cleaner No. 393
- Low Foam Spray Alkaline Cleaner No. 561

BLEACH CLEANERS/CLEANSERS
- Liquid Cleanser with Bleach No. 552
- Thickened Bleach Cleaner No. 543
- Toilet Bowl Cleaner No. 544
- Thickened Bleach Cleaner No. 493

"GREEN" / NATURAL FORMULATIONS
- Non-Silicone Furniture Polish No. 579
- "Green" Liquid Cleanser No. 592
- "Green" Toilet Bowl Cleaner No. 593
- Toilet Bowl Cleaner with "Green" Actives No. 605
- Natural Citrus Furniture Polish No. 608
- "Green" Waterless Hand Cleaner No. 615

OVEN & GRILL CLEANERS
- Solvent-Free Oven and Grill Cleaner No. 227
- Oven Cleaner No. 461
- Potassium Carbonate Oven Cleaner No. 606

METAL SUBSTRATE CLEANERS & POLISHES
- Copper and Brass Cleaner No. 394
- Liquid Silver Cleaner No. 398
- Cold-Process Car Polish No. 581

ACID CLEANERS
- Acid Bowl Cleaner No. 342
- Acid Cleaner No. 540
- Oxalic Acid Gel No. 466
- Acid Cleaner No. 559
- Concentrated Phosphoric Acid Gel No. 607

PAINT & RUST REMOVAL FORMULATIONS
- Paint Stripper for Metal No. 248
- Solvent Paint Remover No. 249
- Low VOC Paint Remover No. 563
- Rust Removal Jelly No. 467

MISCELLANEOUS
- Fine Fabric Wash No. 560
- Aerosol Protective Oven Film No. 251
Liquid Cleanser No. 531

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Van GEL® ES Magnesium Aluminum Silicate</td>
</tr>
<tr>
<td></td>
<td>Water</td>
</tr>
<tr>
<td>B</td>
<td>Calcium Carbonate (#8 White&lt;sup&gt;1&lt;/sup&gt;)</td>
</tr>
<tr>
<td></td>
<td>Sodium methyl-2-sulfo C&lt;sub&gt;12-18&lt;/sub&gt; ester (and) Disodium 2-sulfo C&lt;sub&gt;12-18&lt;/sub&gt; fatty acid (ALPHA-STEP® MC-48&lt;sup&gt;2&lt;/sup&gt;)</td>
</tr>
<tr>
<td>C</td>
<td>Fatty Alkanolamide (NINOL® 11-CM&lt;sup&gt;2&lt;/sup&gt;)</td>
</tr>
<tr>
<td></td>
<td>Sodium Hydroxide, 50% solution</td>
</tr>
<tr>
<td></td>
<td>Sodium Chloride</td>
</tr>
<tr>
<td>D</td>
<td>Preservative</td>
</tr>
</tbody>
</table>

Procedure:

Step 1 – Sift the VAN GEL® into an established vortex in the water. Mix at maximum available shear until fully hydrated.

Step 2 – Add the calcium carbonate and mix until uniform.

Step 3 – Reduce the mixing speed to a minimum; add the Part C and D ingredients in order, mixing after each addition until uniform. Avoid air entrapment.

**RAW MATERIAL SUPPLIERS**

1. Imerys, Inc., Roswell, GA
2. Stepan Company, Northfield, IL

**TRADEMARKS**

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ALPHA-STEP and NINOL are registered trademarks of Stepan Company.

Rev 02/07/2014
### Liquid Cleanser No. 580

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAN GEL® B Magnesium Aluminum Silicate</td>
<td>1.1</td>
</tr>
<tr>
<td>VANZAN® Xanthan Gum</td>
<td>0.4</td>
</tr>
<tr>
<td>Water</td>
<td>43.5</td>
</tr>
<tr>
<td>Sodium Linear Alkyl Benzene Sulfonate, 60% (CALSOFT® L-601)</td>
<td>5.0</td>
</tr>
<tr>
<td>Octoxynol-9 (TRITON® X-100²)</td>
<td>5.0</td>
</tr>
<tr>
<td>Aluminum Silicate (KAOPOLITE® SF³)</td>
<td>10.0</td>
</tr>
<tr>
<td>Orange Oil (Tech Grade d-limonene⁴)</td>
<td>5.0</td>
</tr>
<tr>
<td>Preservative</td>
<td>q.s.</td>
</tr>
</tbody>
</table>

#### Procedure:

**Step 1** – Blend the VAN GEL® and VANZAN® and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Reduce the mixing speed to a minimum and add the Part B ingredients in order, mixing after each addition until uniform. Avoid air entrapment.

**Step 3** – Add the Part C, D and E ingredients in order, mixing after each addition until uniform.

#### RAW MATERIAL SUPPLIERS

1. Pilot Chemical Company, Cincinnati, OH
2. Dow Chemical, Midland, MI
3. Imerys, Inc., Roswell, GA
4. Florida Chemical, Inc., Winter Haven, FL

#### TRADEMARKS

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CALSOFT is a registered trademark of Pilot Chemical Corp.
KAOPOLITE is a registered trademark of Imerys Kaolin Inc.
TRITON is a registered trademark of Union Carbide Corporation.

Rev02/07/2014
## Liquid Tile Cleaner No. 396

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VAN GEL® B Magnesium Aluminum Silicate</td>
</tr>
<tr>
<td></td>
<td>Water</td>
</tr>
<tr>
<td></td>
<td>DARVAN® 7 Sodium Polymethacrylate</td>
</tr>
<tr>
<td></td>
<td>Octoxynol-13 (TRITON® X-1021)</td>
</tr>
<tr>
<td>B</td>
<td>Sodium Alkylbenzene Sulfonate (CALSOFT® L-402)</td>
</tr>
<tr>
<td></td>
<td>Pine Oil</td>
</tr>
<tr>
<td></td>
<td>Aluminum Silicate (KAOPOLITE® SF3)</td>
</tr>
<tr>
<td>C</td>
<td>Preservative</td>
</tr>
</tbody>
</table>

### Procedure:

**Step 1** – Sift the VAN GEL® B into an established vortex in water. Mix at maximum available shear until fully hydrated.

**Step 2** – Reduce the mixing speed and add Part B and C ingredients in order, mixing after each addition until uniform.

### RAW MATERIAL SUPPLIERS

1. Dow Chemical, Midland, MI
2. Pilot Chemical Company, Cincinnati, OH
3. Imerys, Inc., Roswell, GA

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CALSOFT is a registered trademark of Pilot Chemical Corp.

KAOPOLITE is a registered trademark of Imerys Kaolin Inc.

TRITON is a registered trademark of Union Carbide Corporation.

Rev02/07/2014
Bathroom Cleaner No. 393

<table>
<thead>
<tr>
<th></th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>VAN GEL® B</td>
<td>1.00</td>
</tr>
<tr>
<td>Magnesium Aluminum Silicate</td>
<td></td>
</tr>
<tr>
<td>VANZAN®</td>
<td>0.35</td>
</tr>
<tr>
<td>Xanthan Gum</td>
<td></td>
</tr>
<tr>
<td>Deionized Water</td>
<td>86.65</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Diatomaceous Earth (SUPER-FINE SUPER FLOSS®¹)</td>
<td>5.00</td>
</tr>
<tr>
<td>Tetrasodium EDTA</td>
<td>2.75</td>
</tr>
<tr>
<td>Sodium o-Phenylphenate (DOWICIDE® A²)</td>
<td>0.25</td>
</tr>
<tr>
<td>Sodium Alkylbenzene Sulfonate (CALSOFT® L-40³)</td>
<td>3.00</td>
</tr>
<tr>
<td>Glycol Ether Solvent (BUTYL CELLOSOLVE®²)</td>
<td>1.00</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td></td>
</tr>
<tr>
<td>Preservative</td>
<td>q.s.</td>
</tr>
</tbody>
</table>

Procedure:

**Step 1** – Blend the VAN GEL® B and VANZAN® and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Reduce mixing speed and add the Parts B and C ingredients in order, mixing after each addition until uniform.

**TRADEMARKS**

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Cellosolve is a registered trademark of Union Carbide Corporation.

CALSOFT is a registered trademark of Pilot Chemical Corp.

Dowicide is a registered trademark of Dow Chemical Company.

SUPER-FINE SUPER FLOSS is a registered trademark of Imerys Minerals California, Inc.

Rev02/07/2014
Low Foam Spray Alkaline Cleaner No. 561

<table>
<thead>
<tr>
<th></th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>VAN GEL® B Magnesium Aluminum Silicate</td>
<td>1.66</td>
</tr>
<tr>
<td>VANZAN® Xanthan Gum</td>
<td>0.33</td>
</tr>
<tr>
<td>Deionized Water</td>
<td>73.91</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Sodium Metasilicate-9-hydrate</td>
<td>4.50</td>
</tr>
<tr>
<td>C3-C9 Acid Carboxylate (DETERGE LF-715®)</td>
<td>8.00</td>
</tr>
<tr>
<td>Complex Carboxylic Acid Derivative (DECORE IMT-100LF®)</td>
<td>5.00</td>
</tr>
<tr>
<td>Alkoxylated Linear Alcohol (DEIONIC LF-EP-25®)</td>
<td>3.00</td>
</tr>
<tr>
<td>Sodium Hydroxide, 50% solution</td>
<td>3.60</td>
</tr>
</tbody>
</table>

Procedure:

**Step 1** – Blend the VAN GEL® B and VANZAN® and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Add the sodium metasilicate-9-hydrate and dissolve with mixing.

**Step 3** – Reduce the mixing speed and add the remaining Part B ingredients in order, mixing after each addition until uniform.

RAW MATERIAL SUPPLIERS

1DeForest Enterprises, Inc., Boca Raton, FL

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Rev02/07/2014
Liquid Cleanser with Bleach No. 552

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> VAN GEL® O Magnesium Aluminum Silicate</td>
<td>4.0</td>
</tr>
<tr>
<td>Water</td>
<td>62.0</td>
</tr>
<tr>
<td><strong>B</strong> NaOH, 50% solution</td>
<td>1.0</td>
</tr>
<tr>
<td>Commodity NaOCl, 12.5% solution</td>
<td>12.0</td>
</tr>
<tr>
<td>Sodium Dodecyl Diphenyl Oxide Disulfonate (CALFAX® DB-45)</td>
<td>1.0</td>
</tr>
<tr>
<td>Calcium Carbonate (#8 White)</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Procedure:

**Step 1** – Sift the VAN GEL® O into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Slowly add the NaOH solution while mixing. Careful control of the mixing speed is required during this step because the viscosity of the batch will increase. Mix until smooth.

**Step 3** – Check the pH of the batch: it should be >pH 12. Reduce the mixing speed and slowly add the NaOCl.

**Step 4** – Reduce the mixing speed to a minimum, then add the surfactant. Avoid air entrapment.

**Step 5** – Slowly add the calcium carbonate and mix very slowly until homogeneous. Avoid air entrapment.

**Note:** The amount of NaOH in the formula is critical: percentages above or below that listed will be detrimental to the physical and/or bleach stability of the formula. Some of the other factors that can influence both the physical stability and bleach stability of this formula are: any factor that will accelerate bleach decomposition, e.g. metallic contaminants; the amount and source of the commodity bleach; the source of the caustic; the amount and type of surfactant; and the storage conditions of the finished product. It is recommended that the physical and bleach stability profile of this formula be verified.

**RAW MATERIAL SUPPLIERS**

1. Pilot Chemical Company, Cincinnati, OH
2. Imerys, Inc., Roswell, GA

**TRADEMARKS**

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Calfax is a registered trademark of Pilot Chemical Corp.
**Thickened Bleach Cleaner No. 543**

<table>
<thead>
<tr>
<th>A</th>
<th>VAN GEL® O Magnesium Aluminum Silicate</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.50</td>
<td>32.37</td>
</tr>
</tbody>
</table>

| B | Carbomer, 1% Pre-gel*                 |       |
|   | NaOH, 50% solution                    | 2.13  |
|   | Commodity NaOCl, 12.5% solution       | 12.00 |
|   | Sodium Dodecyl Diphenyl Oxide Disulfonate (CALFAX® DB-45) | 1.00  |

**Procedure:**

**Step 1** – Sift the VAN GEL® O into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Slowly add the neutralized 1% Carbopol pre-gel to the Van Gel O dispersion with mixing. Careful control of the mixing speed is required during this step due to a rapid increase in viscosity, followed by a decrease.

**Step 3** – Slowly add the 50% NaOH solution. Check the pH and adjust if necessary to pH=12.7 ± 0.1.

**Step 4** – Reduce the mixing speed and slowly add the NaOCl solution while mixing. A drop in formula viscosity occurs.

**Step 5** – Reduce the mixing speed to a minimum and add the surfactant.

**Step 6** – If necessary, adjust the mixture with additional 50% NaOH solution to pH=12.6 ± 0.1.

**Carbopol Pre-gel:**

| CARBOPOL® C-676 | 1.00 |
| Water          | 96.05 |
| NaOH, 50% solution | 2.95 |

**Procedure for Pre-gel:**

**Step 1** – Carefully shift the Carbopol C-676 into an established vortex in the water. Avoid lumping. Mix with good agitation for a minimum of 45 minutes.

**Step 2** – Very slowly add the 50% NaOH solution with good mixing. Rapid thickening will occur, followed by some decrease in viscosity as the pH increases. Adjust the pH as necessary with additional 50% NaOH solution to pH 12.4 ± 0.1.

---

**Note:** Strict control of the NaOH level to adjust the formula pH is required because it affects the initial viscosity and physical stability of the formula, due to the inherent properties of the carbomer. Proper pH control is also essential for bleach stability. Some of the other factors that can influence both the physical stability and bleach stability of this formula are: any factor that will accelerate bleach decomposition, e.g. metallic contaminants; the amount and source of the commodity bleach; the source of the caustic; the amount and type of surfactant; and the storage conditions of the finished product. It is recommended that the physical and bleach stability profile of this formula verified.

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**RAW MATERIAL SUPPLIERS**

1. Pilot Chemical Company, Cincinnati, OH
2. Lubrizol Advanced Materials, Inc., Cleveland, OH

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Calfax is a registered trademark of Pilot Chemical Corp.

Carbopol is a registered trademark of Lubrizol Advanced Materials, Inc.

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Rev02/07/2014
Before using, read, understand and comply with the information and precautions in the Safety Data Sheets, label and other product literature. The information presented herein, while not guaranteed, was prepared by technical personnel and, to the best of our knowledge and belief, is true and accurate as of the date hereof. No warranty, representation or guarantee, express or implied, is made regarding accuracy, performance, stability, reliability or use. This information is not intended to be all-inclusive, because the manner and conditions of use, handling, storage and other factors may involve other or additional safety or performance considerations. The user is responsible for determining the suitability of any material for a specific purpose and for adopting such safety precautions as may be required. Vanderbilt Chemicals, LLC does not warrant the results to be obtained in using any material, and disclaims all liability with respect to the use, handling or further processing of any such material. No suggestion for use is intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patent, trademark or copyright or to violate any federal, state or local law or regulation.

### Toilet Bowl Cleaner No. 544

<table>
<thead>
<tr>
<th></th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>VAN GEL® O Magnesium Aluminum Silicate</td>
<td>0.5</td>
</tr>
<tr>
<td>Water</td>
<td>19.8</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Carbomer, 0.75% Pre-gel*</td>
<td>66.7</td>
</tr>
<tr>
<td>Commodity NaOCl, 12.5%</td>
<td>12.0</td>
</tr>
<tr>
<td>Sodium Dodecyl Diphenyl Oxide Disulfonate (CALFAK® DB-451)</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Procedure:**

**Step 1** – Sift the VAN GEL® O into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Slowly add the neutralized 0.75% Carbopol pre-gel to the Van Gel O dispersion with mixing. Careful control of the mixing speed is required during this step due to a rapid increase in viscosity, followed by a decrease.

**Step 3** – Check the formula at this point and if necessary, adjust the pH to 12.4 ± 0.1.

**Step 4** – Reduce the mixing speed and slowly add the NaOCl solution while mixing. A drop in formula viscosity occurs.

**Step 5** – Reduce the mixing speed to a minimum and add the surfactant.

**Step 6** – Adjust the pH with additional 50% NaOH solution, if necessary, to pH 12.4 ± 0.1.

**Procedure for Pre-gel:**

**Step 1** – Carefully shift the Carbopol C-676 into an established vortex in the water. Avoid lumping. Mix with good agitation for a minimum of 45 minutes.

**Step 2** – Very slowly add the 50% NaOH solution with good mixing. Rapid thickening will occur, followed by some decrease in viscosity as the pH increases. Adjust the pH as necessary with additional 50% NaOH solution to pH 12.4 ± 0.1.

**Note:** Strict control of the NaOH level to adjust the formula pH is required because it affects the initial viscosity and physical stability of the formula, due to the inherent properties of the carbomer. Proper pH control is also essential for bleach stability. Some of the other factors that can influence both the physical stability and bleach stability of this formula are: any factor that will accelerate bleach decomposition, e.g. metallic contaminants; the amount and source of the commodity bleach; the source of the caustic; the amount and type of surfactant; and the storage conditions of the finished product. It is recommended that the physical and bleach stability profile of this formula verified.

**RAW MATERIAL SUPPLIERS**

1Pilot Chemical Company, Cincinnati, OH
2Lubrizol Advanced Materials, Inc., Cleveland, OH

**TRADEMARKS**

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Calfax is a registered trademark of Pilot Chemical Corp.

Carbopol is a registered trademark of Lubrizol Advanced Materials, Inc.
Thickened Bleach Cleaner No. 493

**A**
- VAN GEL® O Magnesium Aluminum Silicate
- Deionized Water

**B**
- NaOH (50% Solution)
- Commodity NaOCl (12.5% Solution)
- Sodium Dodecyl Diphenyl Oxide Disulfonate (Calfax® DB-45 Surfactant)

**Procedure:**

**Step 1** – Sift the VAN GEL® O into an established vortex in the deionized water. Mix at maximum available shear until completely hydrated.

**Step 2** – Slowly add the NaOH solution while mixing. Careful control of mixing speed is required during this step because the viscosity of the batch will increase. Mix until smooth.

**Step 3** – Check the pH of the batch; it should be above pH 12. Reduce mixing speed and slowly add the NaOCl solution. Mix until uniform.

**Step 4** – Reduce the mixing speed to a minimum, then add the surfactant. Mix until uniform while avoiding air entrapment.

**Formula Characteristics:**
- Initial pH: 12.5
- Initial Assay: 1.5% NaOCl

**Additional Formula Considerations:**
Strict control of the NaOH level to adjust formula pH is required in the preparation of this formula. Proper pH control is essential over the storage life of the product since it has a direct effect on bleach loss. Improper pH control will result in excessive bleach loss.

Some of the other factors that can influence the bleach stability of this formula are: any factor that will accelerate bleach decomposition, e.g. metallic contaminants; the amount and source of the commodity bleach; the source of the caustic; the amount and type of surfactant and the storage conditions of the finished product.

It is therefore recommended that the bleach stability profile of this formula be verified.
Non-Silicone Furniture Polish No. 579

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VAN GEL® B Magnesium Aluminum Silicate</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>VANZAN® Xanthan Gum</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>73.15</td>
</tr>
<tr>
<td>B</td>
<td>Beeswax Emulsion (Kahl Emulsion BE 720¹)</td>
<td>10.00</td>
</tr>
<tr>
<td></td>
<td>Carnauba Wax Emulsion, 40%</td>
<td>10.00</td>
</tr>
<tr>
<td>C</td>
<td>Emulsifying Agent (PLURONIC® L44²)</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>Orange Oil (Tech Grade d-limonene)</td>
<td>5.00</td>
</tr>
<tr>
<td>D</td>
<td>Preservative</td>
<td>q.s.</td>
</tr>
</tbody>
</table>

Procedure:

**Step 1** – Blend the VAN GEL® B and VANZAN® and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Add the Parts B, C and D ingredients in order, mixing after each addition until uniform. Avoid air entrapment.

---

**RAW MATERIAL SUPPLIERS**

¹DeWolf Chemical, Inc., East Providence, RI
²BASF Performance Chemicals, Mount Olive, NJ
³Florida Chemical, Winter Haven, FL

**TRADEMARKS**

Registered and pending trademarks appearing printed in bold in these materials are those of Vanderbilt Minerals, LLC. For a complete listing, please visit http://www.vanderbiltminerals.com/ee_content/Documents/Technical/Trademarks_VM_Web.pdf

Pluronic is a registered trademark of BASF Corporation.

Rev02/07/2014
Before using, read, understand and comply with the information and precautions in the Safety Data Sheets, label and other product literature. The information presented herein, while not guaranteed, was prepared by technical personnel and, to the best of our knowledge and belief, is true and accurate as of the date hereof. No warranty, representation or guarantee, express or implied, is made regarding accuracy, performance, stability, reliability or use. This information is not intended to be all-inclusive, because the manner and conditions of use, handling, storage and other factors may involve other or additional safety or performance considerations. The user is responsible for determining the suitability of any material for a specific purpose and for adopting such safety precautions as may be required. Vanderbilt Chemicals, LLC does not warrant the results to be obtained in using any material, and disclaims all liability with respect to the use, handling or further processing of any such material. No suggestion for use is intended as, and nothing herein shall be construed as, a recommendation to infringe any existing patent, trademark or copyright or to violate any federal, state or local law or regulation.

**PROTOTYPE FORMULA**

"Green" Liquid Cleanser No. 592

<table>
<thead>
<tr>
<th>Component</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td><strong>VAN GEL</strong>&lt;sup&gt;®&lt;/sup&gt; B Magnesium Aluminum Silicate</td>
</tr>
<tr>
<td></td>
<td><strong>VANZAN</strong>&lt;sup&gt;®&lt;/sup&gt; Xanthan Gum</td>
</tr>
<tr>
<td></td>
<td>Water</td>
</tr>
<tr>
<td>B</td>
<td>Pumice (Hess Pumice Grade: FFFF&lt;sup&gt;1&lt;/sup&gt;)</td>
</tr>
<tr>
<td>C</td>
<td>Sodium Methyl 2-sulfolaurate &amp; Disodium 2-sulfolaurate (ALPHA-STEP&lt;sup&gt;®&lt;/sup&gt; MC-48&lt;sup&gt;3&lt;/sup&gt;)</td>
</tr>
<tr>
<td></td>
<td>Orange Oil (Tech Grade d-limonene&lt;sup&gt;3&lt;/sup&gt;)</td>
</tr>
<tr>
<td>D</td>
<td>Preservative</td>
</tr>
</tbody>
</table>

**Procedure:**

**Step 1** – Slowly add the **VAN GEL**<sup>®</sup> B and **VANZAN**<sup>®</sup> sequentially or as a dry blend into an established vortex in the water. Mix at maximum available shear until the **VAN GEL** is fully hydrated and the **VANZAN** is dissolved.

**Step 2** – Slowly add the pumice and mix until uniform.

**Step 3** – Reduce the mixing speed to a minimum; add the Part C & D ingredients in order, mixing after each addition, until uniform. Avoid air entrapment.

**RAW MATERIAL SUPPLIERS**

1. Hess Pumice Products, Inc., Malad City, ID
2. Stepan Company, Northfield, IL
3. Florida Chemical, Winter Haven, FL

**TRADEMARKS**

Registered and pending trademarks appearing printed in bold in these materials are those of Vanderbilt Minerals, LLC. For a complete listing, please visit [http://www.vanderbiltminerals.com/ee_content/Documents/Technical/Trademarks_VM_Web.pdf](http://www.vanderbiltminerals.com/ee_content/Documents/Technical/Trademarks_VM_Web.pdf)

Alpha-Step is a registered trademark of Stepan Company.

Rev02/07/2014
“Green” Toilet Bowl Cleanser No. 593

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
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</thead>
<tbody>
<tr>
<td>VAN GEL® ES Magnesium Aluminum Silicate</td>
<td>1.40</td>
</tr>
<tr>
<td>VANZAN® Xanthan Gum</td>
<td>0.30</td>
</tr>
<tr>
<td>Water</td>
<td>84.80</td>
</tr>
<tr>
<td>L(+)-lactic acid, 80% (PURAC® Sanilac®)</td>
<td>10.00</td>
</tr>
<tr>
<td>Sodium Methyl 2-sulfolaurate &amp; Disodium 2-sulfolaurate (ALPHA-STEP® MC-48®)</td>
<td>3.50</td>
</tr>
</tbody>
</table>

Procedure:

Step 1 – Slowly add the VAN GEL® ES and VANZAN® sequentially or as a dry blend into an established vortex in the water. Mix at maximum available shear until the VAN GEL ES is fully hydrated and the VANZAN is fully dissolved.

Step 2 – Slowly add the Part B ingredients, mixing well after each until uniform. Avoid air entrapment.

RAW MATERIAL SUPPLIERS

1. PURAC America, Lincolnshire, IL
2. Stepan Company, Northfield, IL

TRADEMARKS

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Alpha-Step is a registered trademark of Stepan Company.
Purac is a registered trademark of Purac Biochem B.V.

Rev02/07/2014
Toilet Bowl Cleaner with “Green” Actives No. 605

A | VAN GEL® SX Magnesium Aluminum Silicate | Wt.%
---|------------------------------------------|-----
    | Water | 2.0
B | L(+)-lactic acid, 80% (PURAC® Sanilac\(^1\)) | 10.0
    | Sodium Methyl 2-sulfolaurate & Disodium 2-sulfolaurate (ALPHA-STEP® MC-48\(^2\)) | 3.5

Procedure:

Step 1 – Add the VAN GEL® SX slowly to the water agitated at high speed. Mix until fully hydrated.

Step 2 – Slowly add the Part B ingredients in order, mixing well after each until uniform. Avoid air entrapment.

RAW MATERIAL SUPPLIERS

\(^1\)PURAC America, Lincolnshire, IL
\(^2\)Stepan Company, Northfield, IL

TRADEMARKS

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Alpha-Step is a registered trademark of Stepan Company.
Purac is a registered trademark of Purac Biochem B.V.

Rev02/07/2014
### Natural Citrus Furniture Polish No. 608

<table>
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<tr>
<th>Component</th>
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<tbody>
<tr>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>VAN GEL® SX Magnesium Aluminum Silicate</td>
<td>2.00</td>
</tr>
<tr>
<td>Water</td>
<td>72.65</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Beeswax Emulsion (BE 720&lt;sup&gt;1&lt;/sup&gt;)</td>
<td>10.00</td>
</tr>
<tr>
<td>Carnauba Wax Emulsion, 40%</td>
<td>10.00</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td></td>
</tr>
<tr>
<td>Emulsifying Agent (PLURONIC® L44&lt;sup&gt;2&lt;/sup&gt;)</td>
<td>0.35</td>
</tr>
<tr>
<td>Orange Oil (Tech Grade d-limonene&lt;sup&gt;3&lt;/sup&gt;)</td>
<td>5.00</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td>Preservative</td>
<td>q.s.</td>
</tr>
</tbody>
</table>

### Procedure:

**Step 1** – Add the VAN GEL® SX slowly to the water agitated at high speed. Mix until fully hydrated.

**Step 2** – Slowly add the Part B and Part C ingredients in order, mixing well after each until uniform. Avoid air entrapment.

### RAW MATERIAL SUPPLIERS

1. DeWolf Chemical, Inc., East Providence, RI
2. BASF Performance Chemicals, Mount Olive, NJ
3. Florida Chemical, Winter Haven, FL

### TRADEMARKS

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PLURONIC is a registered trademark of BASF Corporation.

Rev02/07/2014
### “Green” Waterless Hand Cleaner No. 615

<table>
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<tr>
<th>Component</th>
<th>Wt.%</th>
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</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td><strong>VAN GEL® SX</strong> Magnesium Aluminum Silicate</td>
</tr>
<tr>
<td></td>
<td>Water</td>
</tr>
<tr>
<td></td>
<td>Propylene Glycol, USP</td>
</tr>
<tr>
<td></td>
<td>Sodium Lauryl Sulfate (Calfoam® SLS-30¹)</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Orange Oil (Tech Grade d-limonene²)</td>
</tr>
<tr>
<td></td>
<td>C16-C18 Methyl Ester/Sodium Dioctyl Sulfosuccinate Surfactant Blend (Soygold 2500ª Rinseable Solvent³)</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Juglans Regia (Walnut) Shell Powder (AD-9 Cosmetics Grade (Sterilized) 40/100 Walnut Shell Raw Material⁴)</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Preservative</td>
</tr>
</tbody>
</table>

### Procedure:

**Step 1** – Sift the **VAN GEL® SX** into an established vortex in the water. Mix until fully hydrated.

**Step 2** – Add the Part B ingredients and mix thoroughly after each.

**Step 3** – Sift in the ground walnut shell abrasive and mix thoroughly.

**Step 4** – Add the preservative (Part D) and mix thoroughly.

**Note:** Because of the solvents in the formula, verify compatibility with the intended packaging.

---

**RAW MATERIAL SUPPLIERS**

1. Pilot Chemical Company, Cincinnati, OH
2. Florida Chemical, Inc., Winter Haven, FL
3. Ag Environmental Products, LLC, Omaha, NE
4. Composition Materials Co., Inc., Milford, CT

**TRADEMARKS**

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Calfoam is a registered trademark of Pilot Chemical Corp.

Soygold 2500 is a trademark of Ag Environmental Products, LLC.

Rev02/07/2014
Solvent-Free Oven and Grill Cleaner No. 227

<table>
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<tr>
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<tbody>
<tr>
<td>A</td>
<td>VEEGUM® T Magnesium Aluminum Silicate</td>
<td>0.75</td>
</tr>
<tr>
<td>A</td>
<td>VANZAN® Xanthan Gum</td>
<td>0.25</td>
</tr>
<tr>
<td>A</td>
<td>Water</td>
<td>77.00</td>
</tr>
<tr>
<td>B</td>
<td>Sodium Hydroxide, 50% solution</td>
<td>20.00</td>
</tr>
<tr>
<td>B</td>
<td>Sodium Cocoamphoacetate (Amphosol® 1C¹)</td>
<td>2.00</td>
</tr>
</tbody>
</table>

**Procedure:**

**Step 1** – Blend the VEEGUM® T and VANZAN® and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Slowly add the NaOH solution while adjusting the mixing speed as necessary to compensate for the viscosity increase. Mix until smooth and then slowly add the surfactant. Avoid air entrapment.

**RAW MATERIAL SUPPLIERS**

¹Stepan Company, Northfield, IL

**TRADEMARKS**

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Amphosol is a registered trademark of Stepan Company.

Rev02/07/2014
Oven Cleaner No. 461

<table>
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<tr>
<th>A</th>
<th>B</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VAN GEL® B</strong></td>
<td><strong>Magnesium Aluminum Silicate</strong></td>
<td><strong>2.00</strong></td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td><strong>76.25</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Glycol Ether Solvent (DOWANOL®DB¹)</strong></td>
<td><strong>10.00</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Sodium Hydroxide, 50% Solution</strong></td>
<td><strong>10.00</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Aminomethyl Propanol, 95%</strong></td>
<td><strong>1.50</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Sodium Cocoamphoacetate (Amphosol® 1C²)</strong></td>
<td><strong>0.25</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Procedure:**

**Step 1** – Sift the **VAN GEL® B** into an established vortex in water. Mix at maximum available shear until fully hydrated.

**Step 2** – Add the Part B ingredients, mix well after each until uniform while avoiding air entrapment. Add the NaOH solution slowly, adjusting the mixing speed as necessary to compensate for the viscosity increase.

**RAW MATERIAL SUPPLIERS**

1Dow Chemical, Midland, MI
2Stepan Company, Northfield, IL

**TRADEMARKS**

VAN GEL is a registered trademark of Vanderbilt Minerals, LLC.
Amphosol is a registered trademark of Stepan Company.
DOWANOL is a registered trademark of Dow Chemical Company.
## Potassium Carbonate Oven Cleaner No. 606

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<tr>
<td>VAN GEL® SX Magnesium Aluminum Silicate</td>
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</tr>
<tr>
<td>Water</td>
<td>54.0</td>
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<tr>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Triethanolamine</td>
<td>10.0</td>
</tr>
<tr>
<td>Tripropyleneglycol Methyl Ether Solvent (DOWANOL® TPM¹)</td>
<td>5.0</td>
</tr>
<tr>
<td>Potassium Carbonate, 25% solution</td>
<td>28.0</td>
</tr>
<tr>
<td>Sodium Cocoyl Sarcosinate, 30% solution (PERLASTAN® C-30²)</td>
<td>1.0</td>
</tr>
</tbody>
</table>

### Procedure:

**Step 1** – Add the VAN GEL® SX slowly to the water agitated at high speed. Mix until fully hydrated.

**Step 2** – Reduce the mixing speed and add the Part B ingredients in order, mixing after each addition until uniform. Avoid air entrapment.

---

### RAW MATERIAL SUPPLIERS

1. Dow Chemical Company, Midland, MI
2. Struktol Company of America, Stow, OH

### TRADEMARKS

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DOWANOL is a registered trademark of Dow Chemical Company.

PERLASTAN is a registered trademark of Schill & Seilacher GmbH.

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Rev02/07/2014
Copper and Brass Cleaner No. 394

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<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>VAN GEL® B Magnesium Aluminum Silicate</td>
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<tr>
<td>Water</td>
<td>43.0</td>
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<tr>
<td>B</td>
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</tr>
<tr>
<td>Diatomaceous Earth (SUPER-FINE SUPER FLOSS®₁)</td>
<td>15.0</td>
</tr>
<tr>
<td>Ammonium Hydroxide</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Mineral Spirits</td>
<td>30.0</td>
</tr>
<tr>
<td>Oleic Acid</td>
<td>8.0</td>
</tr>
<tr>
<td>Oleamide DEA (NINOL® 201²)</td>
<td>1.5</td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>Preservative</td>
<td>q.s.</td>
</tr>
</tbody>
</table>

Procedure:

Step 1 – Sift the VAN GEL® B into an established vortex in the water. Mix at maximum available shear until fully hydrated.

Step 2 – Add the Part B ingredients in order, mixing after each addition until uniform.

Step 3 – Mix the Part C ingredients until the mixture is clear and then add the water phase at maximum available shear until emulsified.

Step 4 – Add Part D and mix until uniform.

RAW MATERIAL SUPPLIERS

₁IMERYS Filtration Minerals, Lompoc, CA
₂Stepan Company, Northfield, IL

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NINOL is a registered trademark of Stepan Company.
SUPER-FINE SUPER FLOSS is a registered trademark of Imerys Minerals California, Inc.

Rev02/07/2014
Liquid Silver Cleaner No. 398

<table>
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<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VEEGUM® R Magnesium Aluminum Silicate</td>
<td>Diatomaceous Earth (SNOW FLOSS™)</td>
<td>Octoxynol-13 (TRITON® X-120³)</td>
<td>Preservative</td>
</tr>
<tr>
<td></td>
<td>Cellulose Gum (Aqualon® CMC 7MT¹)</td>
<td></td>
<td>VANCHEM™ NATD Metal Deactivator (Disodium Dimercaptothiadiazole)</td>
<td>q.s.</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td>15.0</td>
<td>5.0</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>77.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Procedure:

Step 1 – Blend the VEEGUM® R and CMC and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

Step 2 – Add Part B and mix until smooth.

Step 3 – Reduce the mixing speed and add the Part C ingredients in order, mixing after each addition until uniform.

Step 4 – Add Part D and mix until uniform.

RAW MATERIAL SUPPLIERS

1 Ashland Specialty Ingredients, Wilmington, DE
2 IMERYS Filtration Minerals, Lompoc, CA
3 Dow Chemical, Midland, MI

TRADEMARKS

VEEGUM is a registered trademark of Vanderbilt Minerals, LLC.
VANCHEM is a registered trademark of Vanderbilt Chemicals, LLC.
Aqualon is a registered trademark of Hercules, Inc.
SNOW FLOSS is a trademark of Celite Corporation.
TRITON is a registered trademark of Union Carbide Corporation.
# Cold-Process Car Polish No. 581

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<tr>
<th></th>
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<tbody>
<tr>
<td>A</td>
<td>VANZAN® Xanthan Gum</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>52.15</td>
</tr>
<tr>
<td>B</td>
<td>Polydimethylsiloxane Emulsion (Dow Corning® 346 Emulsion¹)</td>
<td>11.50</td>
</tr>
<tr>
<td></td>
<td>Carnauba Wax Emulsion, 40%</td>
<td>10.00</td>
</tr>
<tr>
<td>C</td>
<td>Emulsifying Agent (PLURONIC® L44²)</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>Isoparaffinic Solvent (ISOPAR® M Fluid³)</td>
<td>10.00</td>
</tr>
<tr>
<td>D</td>
<td>Aluminum Silicate (KAOPOLITE® SF⁴)</td>
<td>15.00</td>
</tr>
<tr>
<td>E</td>
<td>Preservative</td>
<td>q.s.</td>
</tr>
</tbody>
</table>

**Procedure:**

**Step 1** – Sift the VANZAN® into an established vortex in the water. Mix until fully dissolved.

**Step 2** – Add the Part B ingredients in order, mixing after each addition until uniform.

**Step 3** – Add the Part C ingredients in order, mixing after each addition until uniform.

**Step 4** – Add Part D and E and mix until uniform.

**RAW MATERIAL SUPPLIERS**

¹Dow Corning Corp., Midland, MI  
²BASF Performance Chemicals, Mount Olive, NJ  
³ExxonMobil Chemical, Houston, TX  
⁴Imerys, Inc., Roswell, GA

**TRADEMARKS**

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Dow Corning is a registered trademark of Dow Corning Corporation.  
Isopar is a registered trademark of ExxonMobil Corporation.  
KAOPOLITE is a registered trademark of Imerys Kaolin Inc.  
Pluronic is a registered trademark of BASF Corporation.
### Acid Bowl Cleaner No. 342

<table>
<thead>
<tr>
<th></th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>VEEGUM® R Magnesium Aluminum Silicate</td>
<td>0.90</td>
</tr>
<tr>
<td>VANZAN® Xanthan Gum</td>
<td>0.45</td>
</tr>
<tr>
<td>Water</td>
<td>75.40</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Tetrasodium EDTA</td>
<td>1.00</td>
</tr>
<tr>
<td>Oleyl Hydroxyethyl Imidazoline (MONAZOLINE O¹)</td>
<td>1.00</td>
</tr>
<tr>
<td>Hydrochloric Acid, 37%</td>
<td>20.00</td>
</tr>
<tr>
<td>Benzalkonium Chloride (BARQUAT® MB-80²)</td>
<td>1.25</td>
</tr>
</tbody>
</table>

**Procedure:**

**Step 1** – Blend the VEEGUM® R and VANZAN® and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Reduce the mixing speed and add the Part B ingredients in order, mixing after each addition until uniform.

---

**RAW MATERIAL SUPPLIERS**

1. Croda Inc., Edison, NJ
2. Lonza, Inc., Aliendale, NJ

**TRADEMARKS**

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BARQUAT is a registered trademark of Lonza, Inc.

Rev02/07/2014
PROTOTYPE FORMULA

Acid Cleaner No. 540

<table>
<thead>
<tr>
<th></th>
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<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VAN GEL® ES Magnesium Aluminum Silicate</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>VANZAN® Xanthan Gum</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>62.5</td>
</tr>
<tr>
<td>B</td>
<td>Phosphoric Acid, 85%</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Octoxynol-9 (TRITON® X-100)</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Procedure:

**Step 1** – Blend the VAN GEL® ES and VANZAN® and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Reduce the mixing speed and add the Part B ingredients in order, mixing after each addition until uniform.

RAW MATERIAL SUPPLIERS

1Dow Chemical, Midland, MI

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Triton is a registered trademark of Union Carbide Corporation.

Rev02/07/2014
Oxalic Acid Gel No. 466

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>VAN GEL®</td>
<td></td>
</tr>
<tr>
<td>B Magnesium Aluminum Silicate</td>
<td>2.5</td>
</tr>
<tr>
<td>VANZAN®</td>
<td></td>
</tr>
<tr>
<td>Xanthan Gum</td>
<td>0.8</td>
</tr>
<tr>
<td>Water</td>
<td>53.7</td>
</tr>
<tr>
<td>B Oxalic Acid Dihydrate, 12.5% Aqueous Solution</td>
<td>40.0</td>
</tr>
<tr>
<td>Polysorbate 40 (TWEEN® 40¹)</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Procedure:

Step 1 — Blend the VAN GEL® B and VANZAN® and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

Step 2 — Reduce the mixing speed and add the Part B ingredients in order, mixing after each addition until uniform.

RAW MATERIAL SUPPLIERS

1 Croda Inc., Edison, NJ

TRADEMARKS

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TWEEN is a registered trademark of Uniqema Americas LLC.

Rev02/07/2014
Acid Cleaner No. 559

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>VANZAN® Xanthan Gum</td>
</tr>
<tr>
<td></td>
<td>Water</td>
</tr>
<tr>
<td>B</td>
<td>Phosphoric Acid, 85%</td>
</tr>
<tr>
<td></td>
<td>Modified Ethoxylated Carboxylate (DeTERGE LF-73151)</td>
</tr>
</tbody>
</table>

Procedure:

**Step 1** – Sift the VANZAN® into an established vortex in the water. Mix until fully dissolved.

**Step 2** – Add the phosphoric acid slowly and mix thoroughly. Reduce mixing speed and then add the surfactant slowly. Mix until uniform while avoiding air entrapment.

RAW MATERIAL SUPPLIERS

1DeForest Enterprises, Inc., Boca Raton, FL

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Rev02/07/2014
### Concentrated Phosphoric Acid Gel No. 607

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>VAN GEL® SX Magnesium Aluminum Silicate</td>
<td>2.5</td>
</tr>
<tr>
<td>Water</td>
<td>62.5</td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Phosphoric Acid, 85%</td>
<td>30.0</td>
</tr>
<tr>
<td>Octoxynol-9 (TRITON® X-100)</td>
<td>5.0</td>
</tr>
</tbody>
</table>

#### Procedure:

**Step 1** – Add the VAN GEL® SX slowly to the water agitated at high speed. Mix until fully hydrated.

**Step 2** – Reduce mixing speed and add the Part B ingredients in order, mixing after each addition until uniform. Avoid air entrapment.

**RAW MATERIAL SUPPLIERS**

1. Dow Chemical, Midland, MI

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TRITON is a registered trademark of Union Carbide Corporation.

Rev02/07/2014
**Paint Stripper for Metal No. 248**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VEEGUM® T Magnesium Aluminum Silicate</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>VANZAN® Xanthan Gum</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>65.50</td>
<td></td>
</tr>
<tr>
<td><strong>B</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stepanate® SXS40[^1^], Sodium Xylene Sulfonate, 40% liquid</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Foamphos NP-6[^2^], Phosphate Ester</td>
<td>2.50</td>
<td></td>
</tr>
<tr>
<td><strong>C</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium Hydroxide (50% Solution)</td>
<td>30.00</td>
<td></td>
</tr>
</tbody>
</table>

**Procedure:**

**Step 1** – Prepare Part A by dry blending the VEEGUM® T and VANZAN®, then slowly sift the blend into an established vortex (or add sequentially). Mix at maximum available shear until the VEEGUM T is fully hydrated.*

**Step 2** – Reduce mixing speed and, in the ordered listed, add Part B ingredients to Part A. Mix thoroughly while avoiding air entrapment.

**Step 3** – Add Part C very slowly and mix until uniform.

*Refer to the VEEGUM®/VAN GEL® brochure for hydration guidelines.

**Directions for use:** Apply liberally with a brush to a painted metal surface. Allow to stand until the old finish is loosened from the surface (10 to 20 minutes). Remove old finish with a scraper or steel wool. Rinse surface with water.

**Caution:** Contains caustic. Wear skin and eye protection.

**RAW MATERIAL SUPPLIERS**

[^1^] Stepan Company, Northfield, IL

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Stepanate is a registered trademark of Stepan Company.

Rev09/12/2013
Solvent Paint Remover No. 249

This paint remover gel uses a synergistic combination of VEEGUM® PRO Magnesium Aluminum Silicate and hydroxypropylcellulose to provide thickening and vertical surface cling. This allows the solvent longer contact time on the painted surface.

| A | VEEGUM® PRO Magnesium Aluminum Silicate | Water |
| B | N-methyl-2-pyrrolidone | Klucel M IND¹, Hydroxypropylcellulose |
|   | Wt. % | 1.0 | 25.0 | 73.0 | 1.0 |

Procedure:

Step 1 – Sift the VEEGUM® PRO into an established vortex in the water. Mix at maximum available shear until the VEEGUM PRO is fully hydrated.*

Step 2 – While mixing, slowly add the N-methyl-2-pyrrolidone in order to avoid an excessive exotherm in the batch.

Step 3 – Cool white mixing to ~30°C, then slowly sift in the Klucel M and mix until it is completely dissolved.

*Refer to the VEEGUM®/VAN GEL® brochure for hydration guidelines.

This formula passed six (6) months of laboratory stability testing at room temperature and three (3) month at 38°C.

RAW MATERIAL SUPPLIERS

¹Hercules Inc., Wilmington, DE

TRADEMARKS

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Rev09/12/2013
Low VOC Paint Remover No. 563

A

| VEEGUM® PRO Magnesium Aluminum Silicate | Wt.% |
| Water | 1.0 |
|       | 33.0 |

B

| N-methyl-2-pyrrolidone | Wt.% |
| Dipropylene Glycol Methyl Ether Acetate | 32.0 |
| Pcoxyxynol-9 (Triton® X-100) | 1.0 |
| Hydroxypropylcellulose (Klucel® M IND) | 1.0 |

Procedure:

Step 1 – Sift the VEEGUM® PRO into an established vortex in the water. Mix at maximum available shear until the VEEGUM PRO is fully hydrated.

Step 2 – While mixing, slowly add the N-methyl-2-pyrrolidone in order to avoid an excessive exotherm in the batch.

Step 3 – Cool while mixing to ~30°C, and then slowly add the dipropylene glycol methyl ether acetate, followed by the surfactant.

Step 4 – Slowly sift the Klucel M and mix until it is completely dissolved. Avoid air entrapment.

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Klucel is a registered trademark of Hercules, Inc.

Triton is a registered trademark of Union Carbide Corporation.

Rev02/07/2014
Rust Removal Jelly No. 467

<table>
<thead>
<tr>
<th></th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>VAN GEL® B</td>
<td>3.0</td>
</tr>
<tr>
<td>Magnesium Aluminum Silicate</td>
<td></td>
</tr>
<tr>
<td>VANZAN®</td>
<td>0.8</td>
</tr>
<tr>
<td>Xanthan Gum</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>53.2</td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Phosphoric Acid, 50% Aqueous Solution</td>
<td>40.0</td>
</tr>
<tr>
<td>Octoxynol-9 (Triton® X-100)</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Procedure:

Step 1 – Blend the Van Gel® B and VANZAN® and sift into an established vortex in the water. Mix at maximum available shear until fully hydrated.

Step 2 – Reduce the stirrer speed to produce a slight vortex and slowly add the phosphoric acid solution.

Step 3 – When all the acid has been added, add the octoxynol-9 and mix until uniform.

RAW MATERIAL SUPPLIERS

1 Dow Chemical, Midland, MI

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Triton is a registered trademark of Union Carbide Corporation.

Rev02/07/2014
## Fine Fabric Wash No. 560

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>VANZAN® Xanthan Gum</td>
<td>0.75</td>
</tr>
<tr>
<td>Water</td>
<td>76.52</td>
</tr>
<tr>
<td>Disodium EDTA</td>
<td>0.05</td>
</tr>
<tr>
<td>Alpha Olefin Sulfonate (Witconate AOS)</td>
<td>10.00</td>
</tr>
<tr>
<td>Sodium Laureth-2 Sulfate (Steol® CS-270)</td>
<td>10.00</td>
</tr>
<tr>
<td>Lauramine Oxide (Ammonyx® LO)</td>
<td>2.00</td>
</tr>
<tr>
<td>DMDM Hydantoin (and) Iodopropynyl Butylcarbamate (Dantoguard® Plus Liquid)</td>
<td>0.40</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>Citric Acid, 20% Solution</td>
<td>0.28</td>
</tr>
</tbody>
</table>

**Procedure:**

**Step 1** – Sift the VANZAN® into an established vortex in water. Mix until completely dissolved.

**Step 2** – Add the disodium EDTA and mix until completely dissolved. Reduce mixing speed and add the remaining Part B ingredients in the order listed, mixing after each until homogeneous. Avoid air entrapment.

**Step 3** – Adjust to pH 7.5 ± 0.5 with the citric acid solution.

**RAW MATERIAL SUPPLIERS**

1. AkzoNobel Surface Chemistry LLC, Bridgewater, NJ
2. Stepan Company, Northfield, IL
3. Lonza, Inc., Allendale, NJ

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Ammonyx is a registered trademark of Millmaster Onyx Group, Inc.
Dantoguard is a registered trademark of Lonza, Inc.
Steol is a registered trademark of Stepan Company.

Rev02/07/2014
### Aerosol Protective Oven Film No. 251

<table>
<thead>
<tr>
<th>Component</th>
<th>Wt.%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> VEEGUM® T Magnesium Aluminum Silicate</td>
<td>2.9</td>
</tr>
<tr>
<td>Water</td>
<td>86.4</td>
</tr>
<tr>
<td><strong>B</strong> Ethylene Oxide/Propylene Oxide Copolymer (PLURONIC® F-127&lt;sup&gt;1&lt;/sup&gt;)</td>
<td>4.3</td>
</tr>
<tr>
<td>Dimethicone, 60,000 cs (Xiameter® PMX-200 Silicone Fluid 6,000CS&lt;sup&gt;2&lt;/sup&gt;)</td>
<td>6.4</td>
</tr>
<tr>
<td><strong>C</strong> Preservative</td>
<td>q.s.</td>
</tr>
</tbody>
</table>

**Procedure:**

**Step 1** – Sift the VEEGUM® T into an established vortex in the water. Mix at maximum available shear until fully hydrated.

**Step 2** – Reduce the mixing speed and add the Part B and C ingredients in order, mixing after each addition until uniform.

---

**RAW MATERIAL SUPPLIERS**

1. BASF Performance Chemicals, Mount Olive, NJ
2. Dow Corning Corporation, Midland, MI

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*Pluronic is a registered trademark of BASF Corporation.*

*Xiameter is a registered trademark of Dow Corning Corporation.*

Rev02/07/2014