PQ Corporation, recently acquired by JPMorgan Partners, is a leading producer of silicate, zeolite, and other performance materials serving the detergent, pulp and paper, chemical, petroleum, catalyst, water treatment, construction, and beverage markets. It is a global enterprise, operating in 19 countries on five continents, and along with its chemical businesses, includes Potters Industries, a wholly owned subsidiary, which is a leading producer of engineered glass materials serving the highway safety, polymer additive, metal finishing, and conductive particle markets.

**Detergent Formulary**

**Detergency**

In the most basic terms, detergency is the process of removing soil from the surface to which it clings. This definition requires the formulator to consider the following: the nature of the soil to be removed, the substrate or surface to which it clings, the process by which the soil is to be removed, the type of water to be used, and its temperature. The substrate or surface may be fabric, metal, ceramic, glass, masonry, or concrete. The type of soil can be particulate, carbonaceous, or oily.

An effective cleaning compound must perform certain basic functions during the process of soil removal. These functions include: neutralizing acidic soil components, emulsification of oils and greases, deflocculating particulate soil, suspending soil and preventing redeposition.

PQ® sodium and potassium silicates and sodium metasilicates contain optimum proportions of alkali and silica for most cleaning requirements. They scatter grease and dirt deposits into small, suspended particles which rinse away without redepositing on freshly washed surfaces.
The use of sodium and potassium silicates and sodium metasilicate improves soil suspension so that the cleaned material does not act as a “filter” when the wash water is drained. The silica content also moderates the alkali’s tendency to corrode sensitive metals. Silica contributes substantially to the unique buffering action of the metasilicates. It enables them to maintain effective pH levels during cleaning operations despite sudden and heavy introduction of acidic soils. Initial supplies last longer in the detergent bath, whereas an unbuffered alkali quickly loses its strength. This results in a sharp drop-off in pH with the consequent loss in cleaning action.

Silicates increase the effectiveness of surfactants or soaps. A combination of silicates and complex phosphates offers a synergistic effect which results in more effective detergency than corresponding amounts of either component used alone. Moreover, in situations where phosphates are not used, alkaline silicates in combination with VALFOR® synthetic zeolites have proven to be very efficient and cost effective for softening water.

HOW TO USE THIS DOCUMENT

This document provides basic starting formulations for cleansing compounds and detergents. In general, the formulations have been taken from the published literature. We have not tested them, but they appear reasonable and are offered as starting points for those who wish to develop their own compounds.

All recommended percentages are on a weight/weight basis.

To locate a formulation for a particular cleaning application, check the index on page 1.

Products of the PQ Corporation used in the formulations are identified by their trademarks as follows: METSO BEADS® 2048 and METSO PENTABEAD® 20 sodium metasilicate; BRITESIL® hydrous polysilicates; KASIL® potassium silicates; A®2447, D®, N®, and STAR® liquid sodium silicates; G® hydrous sodium silicate powder; PQ® epsom salt; and VALFOR® 100 synthetic zeolite.

CHEMICAL ABBREVIATIONS USED IN THE FORMULATIONS

CMC - Carboxymethylcellulose  
EDTA - Ethylenediamine tetra acetic acid  
LAS - Linear alkylbenzene sulfonate  
STPP - Sodium tripolyphosphate  
TKPP - Tetrapotassium pyrophosphate  
TSP - Trisodium phosphate, anhydrous  
TSPP - Tetrasodium pyrophosphate

Note: The formula ingredients are listed in order of addition. It is recommended that bench-scale quantities of the formulations be made and evaluated before production is initiated. The EO (ethylene oxide) listed for certain ingredients is varied to achieve desired cloud point and foaming characteristics.
### AIRCRAFT AND AUTOMOTIVE CLEANERS (INDUSTRIAL)

**Aircraft Cleaner:**
- **METSO PENTABEAD® 20** sodium metasilicate: 30%
- **STPP**: 30%
- Ammonium bifluoride: 8%
- **TSPP**: 20%
- Sodium alkylnaphthalene sulfonate: 8%
- Sodium alkylaryl sulfonate powder (90%): 4%

**Carwash—Liquids:**
- **Water**: 77%
- **TKPP (60%)**: 12%
- **KASIL® #6** potassium silicate: 5%
- Phosphate ester: 1%
- C9-C11 linear alcohol, 6 moles EO: 5%
- **Water**: 62%
- **TKPP (60%)**: 15%
- **STAR®** sodium silicate: 6%
- Sodium xylene sulfonate (40%): 12%
- C9-C11 linear alcohol, 6 moles EO: 5%

**Carwash—Powders:**
- **METSO BEADS® 2048** sodium metasilicate: 20%
- **STPP**: 40%
- **TSP**: 5%
- Sodium carbonate: 20%
- Alkylaryl sulfonate powder: 5%
- C9-C11 linear alcohol, 6 moles EO: 10%
- **METSO PENTABEAD® 20** sodium metasilicate: 30%
- **STPP**: 44%
- Sodium carbonate: 15%
- CMC: 1%
- Octylphenol, 7-8 moles EO: 5%
- Octylphenol, 5 moles EO: 5%

**Engine Cleaner:**
- Sodium carbonate: 40%
- **TSPP**: 20%
- C9-C11 linear alcohol, 6 moles EO: 15%
- **METSO PENTABEAD® 20** sodium metasilicate: 25%
INDUSTRIAL CHEMICALS DIVISION

Truck Wash—Powders:
METSO PENTABEAD® 20 sodium metasilicate 20%
Sodium carbonate 30%
STPP 35%
Sodium alkylaryl sulfonate 15%
Sodium carbonate 40%
Nonylphenol, 9-10 moles EO 5%
TSPP 25%
METSO PENTABEAD® 20 sodium metasilicate 20%
Sodium alkylaryl sulfonate 10%

Whitewall Tire Cleaners:
LIQUIDS:
Water 70%
Potassium hydroxide (45%) 16%
N° Clear sodium silicate 10%
Sodium alkylaryl sulfonate (60%) 2%
C9-C11 linear alcohol, 6 moles EO 2%
Water 74.3%
TSP, anhydrous 4.5%
STAR® sodium silicate 8.0%
Sodium hydroxide (50%) 3.3%
Sodium xylene sulfonate (40%) 6.3%
Sodium alkylaryl sulfonate (60%) 1.6%
C9-C11 linear alcohol, 6 moles EO 2.0%

POWDER:
STPP 45%
C9-C11 linear alcohol, 6 moles EO 5%
TSP 10%
Sodium alkylaryl sulfonate 10%
METSO BEADS® 2048 sodium metasilicate 30%
FOOD & DAIRY CLEANERS (INDUSTRIAL AND INSTITUTIONAL)

**Baking Pan Cleaners:**
- Sodium carbonate: 35%
- STPP: 12%
- Nonylphenol, 9-10 moles EO: 3%
- METSO PENTABEAD® 20 sodium metasilicate: 50%

**Dairy Piping Cleaner:**
- Sodium carbonate: 30%
- STPP: 25%
- Triton DF-16: 5%
- METSO BEADS® 2048 sodium metasilicate: 30%
- Sodium hydroxide beads: 10%
- Sodium carbonate: 28%
- STPP: 35%
- C12-C15 linear alcohol, 12 moles EO: 5%
- Alkylaryl sulfonate, acid (98%): 2%
- METSO BEADS® 2048 sodium metasilicate: 30%

**Egg Cleaner:**
- TSPP: 32%
- Sodium carbonate: 30%
- METSO BEADS® 2048 sodium metasilicate: 20%
- Sodium sulfate: 10%
- Sodium dichloroisocyanurate 2H₂O: 3%
- Sodium alkylaryl sulfonate: 5%

**Grill Cleaner:**
- Water: 78.2%
- Sodium acrylate (MW 4500-5500): 0.5%
- METSO BEADS® 2048 sodium metasilicate: 7.9%
- TKPP (60%): 3.0%
- Phosphate ester: 5.4%
- Octylphenol, 9-10 moles EO: 5.0%

**Milk Can Cleaner:**
- STPP: 30%
- METSO BEADS® 2048 sodium metasilicate: 30%
- Sodium carbonate: 35%
- Sodium dichloroisocyanurate, 2H₂O: 3%
- Sodium alkylaryl sulfonate: 2%

**Sanitizing Cleaners:**
- STPP: 30%
- Sodium carbonate: 25%
- C12-C16 linear alcohol, 12 moles EO: 10%
- METSO PENTABEAD® 20 sodium metasilicate: 30%
- Quaternary germicide: 5%
- METSO BEADS® 2048 sodium metasilicate: 20%
- Sodium carbonate: 35%
- STPP: 30%
- Sodium dichloroisocyanurate, 2H₂O: 10%
- Sodium alkylaryl sulfonate: 5%
## METAL CLEANING (INDUSTRIAL)

### Aluminum:
- **METSO BEADS® 2048 sodium metasilicate**: 45%
- **STPP**: 30%
- **Sodium bicarbonate**: 20%
- **Sodium resinate**: 3%
- **Octylphenol, 9-10 moles EO**: 2%
- **Water**: 33%
- **Potassium hydroxide (45%)**: 30%
- **N® Clear sodium silicate**: 20%
- **Sodium xylene sulfonate (40%)**: 12%
- **Nonylphenol, 9-10 moles EO**: 3%
- **Gluconic acid (45%)**: 2%

### Degreaser:
- **Water**: 62%
- **METSO BEADS® 2048 sodium metasilicate**: 8%
- **EDTA, tetrasodium (37%)**: 10%
- **Phosphate ester**: 10%
- **C9-C11 linear alcohol, 6 moles EO**: 5%
- **C9-C11 linear alcohol, 2.5 moles EO**: 5%

### Destainer:
- **STPP**: 25%
- **METSO BEADS® 2048 sodium metasilicate**: 25%
- **Octylphenol**: 2%
- **Sodium sulfate**: 8%
- **PQ® Magnesium Sulfate**: 2%
- **Sodium perborate, monohydrate**: 38%

### Ferrous Metals—Immersion:

#### LIQUID—LIGHT DUTY:
- **Water**: 49%
- **Potassium hydroxide (45%)**: 12%
- **METSO BEADS® 2048 sodium metasilicate**: 12%
- **TKPP (60%)**: 12%
- **Sodium xylene sulfonate (40%)**: 12%
- **Nonylphenol, 11-13 moles EO**: 3%

#### POWDER—HEAVY DUTY:
- **Sodium carbonate**: 22%
- **TSPP**: 10%
- **Nonylphenol, 11-13 moles EO**: 3%
- **Sodium gluconate**: 5%
- **METSO BEADS® 2048 sodium metasilicate**: 20%
- **Sodium hydroxide beads**: 40%
INDUSTRIAL CHEMICALS DIVISION

POWDER—MEDIUM DUTY:
- Sodium carbonate 40%
- TSP 16%
- Nonylphenol, 11-13 moles EO 4%
- METSO BEADS® 2048 sodium metasilicate 14%
- Sodium lignosulfonate 4%
- Sodium hydroxide beads 22%

POWDER—LIGHT DUTY:
- Sodium carbonate 45%
- STPP 25%
- Nonylphenol, 11-13 moles EO 5%
- METSO BEADS® 2048 sodium metasilicate 25%

Ferrous Metals—Spray:

LIQUID—LIGHT DUTY
- Water 10.0%
- Phosphate ester, potassium salt 4.5%
- Nonylphenol, 9-11 moles EO 1.0%
- Potassium hydroxide (45%) 38.0%
- STAR® sodium silicate 45.0%
- Gluconic acid (50%) 1.5%

POWDER—LIGHT DUTY
- Sodium carbonate 55%
- TSPP 11%
- C12-C13 linear alcohol, 1 mole EO 2%
- C12-C13 linear alcohol, 3 moles EO 2%
- METSO PENTABEAD® 20 sodium metasilicate 25%
- Sodium gluconate 5%
HEAVY DUTY CLEANERS (INDUSTRIAL)

**CIP Cleaners:**
- **STPP:** 40%
- Sodium carbonate: 12%
- C12-C13 linear alcohol, 3 moles EO: 3%
- METSO BEADS® 20 sodium metasilicate: 25%
- Sodium hydroxide beads: 20%
- **STPP:** 40%
- Sodium carbonate: 12%
- C12-C13 linear alcohol, 3 moles EO: 3%
- METSO PENTABEAD® 20 sodium metasilicate: 45%

**Concrete Cleaners:**
- **STPP:** 10%
- Sodium carbonate: 26%
- Nonylphenol, 9-10 moles EO: 6%
- Pine oil: 3%
- METSO PENTABEAD® 20 sodium metasilicate: 55%
- TSP: 20%
- Sodium carbonate: 25%
- Pine oil: 2%
- Sodium alkylaryl sulfonate: 9%
- METSO BEADS® 2048 sodium metasilicate: 30%
- Sodium hydroxide beads: 14%

**Fuel Oil Tank Cleaner:**
- Water: 83.0%
- METSO PENTABEAD® 20 sodium metasilicate: 4.0%
- TKPP: 2.0%
- Sodium xylene sulfonate (40%): 6.0%
- Sodium lignosulfonate: 1.0%
- Octylphenol, 6-7 moles EO: 1.5%
- Octylphenol, 9-10 moles EO: 2.5%

**Printing Plant Cleaner:**
- METSO PENTABEAD® 20 sodium metasilicate: 100%

**Usage:** 4-6 oz./gal. water

**Steam Cleaners:**

**LIQUIDS:**
- Water: 18.8%
- TKPP: 17.2%
- Potassium hydroxide (45%): 31.3%
- Phosphate ester: 2.3%
- Octylphenol, 7-8 moles EO: 0.4%
Steam Cleaners:

**LIQUIDS (Continued):**

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<th>Percentage</th>
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<tbody>
<tr>
<td>Water</td>
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<td>TKPP</td>
<td>17.2%</td>
</tr>
<tr>
<td>Potassium hydroxide (45%)</td>
<td>31.1%</td>
</tr>
<tr>
<td>Phosphate ester</td>
<td>2.0%</td>
</tr>
<tr>
<td>C9-C11 linear alcohol, 6 moles EO</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

**POWDERs:**

<table>
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<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>STPP</td>
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<tr>
<td>Sodium carbonate</td>
<td>20%</td>
</tr>
<tr>
<td>C9-C10 linear alcohol, 12 moles EO</td>
<td>10%</td>
</tr>
<tr>
<td>METSO BEADS® 2048 sodium metasilicate</td>
<td>35%</td>
</tr>
<tr>
<td>STPP</td>
<td>50%</td>
</tr>
<tr>
<td>C9-C10 linear alcohol, 12 moles EO</td>
<td>3%</td>
</tr>
<tr>
<td>Sodium gluconate</td>
<td>2%</td>
</tr>
<tr>
<td>METSO PENTABEAD® 20 sodium metasilicate</td>
<td>45%</td>
</tr>
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**HARD SURFACE CLEANERS (INDUSTRIAL AND INSTITUTIONAL)**

**LIQUIDS:**

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<th>Component</th>
<th>Percentage</th>
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<tr>
<td>TSP</td>
<td>1.6%</td>
</tr>
<tr>
<td>Sodium hydroxide (50%)</td>
<td>4.0%</td>
</tr>
<tr>
<td>Phosphate ester</td>
<td>5.0%</td>
</tr>
<tr>
<td>C9-C11 linear alcohol, 6 moles EO</td>
<td>2.8%</td>
</tr>
<tr>
<td>C9-C11 linear alcohol, 2.5 moles EO</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Water</td>
<td>28%</td>
</tr>
<tr>
<td>N® Clear sodium silicate</td>
<td>10%</td>
</tr>
<tr>
<td>Sodium hydroxide (50%)</td>
<td>5%</td>
</tr>
<tr>
<td>EDTA, tetrasodium (37%)</td>
<td>20%</td>
</tr>
<tr>
<td>Sodium xylene sulfonate (40%)</td>
<td>30%</td>
</tr>
<tr>
<td>C12-C13 linear alcohol, 6.5 moles EO</td>
<td>7%</td>
</tr>
</tbody>
</table>
MACHINE DISHWASH DETERGENTS (INSTITUTIONAL)

LIQUIDS:
- Water: 50.9%
- ACUSOL 810*: 6.9%
- Triton DF-16*: 3.0%
- Potassium hydroxide (45%): 1.2%
- TKPP (60%): 25.0%
- N® Clear sodium silicate: 13.0%
- Water: 10%
- Potassium hydroxide (45%): 35%
- KASIL® #1 potassium silicate: 30%
- TKPP (60%): 20%
- Sodium hypochlorite (15%): 5%

POWDERs:
- STPP: 40%
- METSO BEADS® 2048 sodium metasilicate: 20%
- Sodium carbonate: 15%
- Sodium hydroxide beads: 20%
- Chlorinated TSP: 5%
- STPP: 40%
- Sodium carbonate: 24%
- C12-C13 linear alcohol, 5 moles EO: 6%
- METSO PENTABEAD® 20 sodium metasilicate: 30%

*Dow Chemical  +Rohm and Haas Company

LAUNDRY DETERGENTS (INDUSTRIAL AND INSTITUTIONAL)

LIQUIDS—(Dispersions):
- Water: 69.0%
- STPP: 17.0%
- Potassium hydroxide (45%): 1.6%
- KASIL® #6 potassium silicate: 7.4%
- LAS: 5.0%
- Water: 54.5%
- TKPP: 4.6%
- Sodium hydroxide (45%): 4.2%
- Potassium hydroxide (45%): 13.7%
- Phosphate ester: 5.0%
- C12-C15 linear alcohol, 9 moles EO: 3.0%
- Water: 28.7%
- Fluorescent brightener: 0.1%
- CMC: 0.5%
- ACUSOL 810*: 6.0%
- Nonylphenol, 9-10 moles EO: 10.0%
- Potassium hydroxide (45%): 2.2%
- TKPP (60%): 40.0%
- KASIL® #6 potassium silicate: 12.5%
LIQUID—(Solution):
Water 69.0%
Potassium hydroxide (45%) 1.6%
STPP 17.0%
KASIL® #6 potassium silicate 7.4%
LAS 5.0%

POWDER—Linen Supply:
MODERATE TO HIGH ALKALINITY:
Sodium carbonate 30%
STPP 20%
Nonylphenol, 9-10 moles EO 8%
Sodium sulfate 6%
LAS 4%
METSO BEADS® 2048 sodium metasilicate 30%
CMC 2%
METSO BEADS® 2048 sodium metasilicate 30%
Sodium carbonate 20%
STPP 20%
LAS 12%
CMC 2%
Sodium hydroxide beads 16%
LOW ALKALINITY:
BRITESIL® H₂O hydrous polysilicate 20%
STPP 26%
Sodium carbonate 28%
Nonylphenol, 9-10 moles EO 10%
Sodium sulfate 10%
CMC 2%
LAS 4%
PHOSPHOROUS-FREE:
VALFOR® 100 zeolite A 20%
Sodium carbonate 28%
Sodium polyacrylate (MW 4500-55000) 2%
Nonylphenol, 9-10 moles EO 8%
LAS 4%
METSO BEADS® 2048 sodium metasilicate 36%
CMC 2%

POWDER—Industrial Supply:
MODERATE ALKALINITY:
Sodium carbonate 20%
STPP 15%
Nonylphenol, 9-10 moles EO 12%
Sodium sulfate 16%
Polyvinylpyrrolidone 1%
CMC 1%
METSO BEADS® 2048 sodium metasilicate 35%
**INDUSTRIAL CHEMICALS DIVISION**

**LOW ALKALINITY:**

- BRITESIL® C24 hydrous polysilicate 20%
- STPP 16%
- Sodium carbonate 20%
- Sodium sulfate 30%
- Polyvinylpyrrolidone 1%
- CMC 1%
- Nonylphenol, 9-10 moles EO 12%

**PHOSPHOROUS-FREE:**

- VALFOR® 100 zeolite A 14%
- Sodium carbonate 20%
- Nonylphenol, 9-10 moles EO 14%
- Sodium sulfate 20%
- Polyvinylpyrrolidone 1%
- CMC 1%
- METSO BEADS® 2048 sodium metasilicate 30%

*NOTE: An optical brightener is recommended in the above formulations.*

**LAUNDRY ALKALI BUILDERS (INDUSTRIAL & INSTITUTIONAL)**

**POWders:**

**HIGH ALKALINITY:**

- METSO BEADS® 2048 sodium metasilicate 60%
- Sodium hydroxide beads 40%

- METSO BEADS® 2048 sodium metasilicate 30%
- STPP 20%
- Sodium carbonate 28%
- CMC 2%
- Sodium hydroxide beads 20%

**MODERATE ALKALINITY:**

- METSO BEADS® 2048 sodium metasilicate 100%

**LIQUIDS:**

**LINEN SUPPLY:**

- N® Clear sodium silicate 62%
- Potassium hydroxide (45%) 38%

- N® Clear sodium silicate 52%
- Potassium hydroxide (flake) 37%
- Water 11%

- N® Clear sodium silicate 52%
- Sodium hydroxide beads 14%
- Potassium hydroxide (flake) 28%
- Water 6%

**INDUSTRIAL SUPPLY:**

- D® sodium silicate 90%
- Water 10%

- N® Clear sodium silicate 88%
- Sodium hydroxide (50%) 12%
LAUNDRY DETERGENTS (CONSUMER)

DRY BLENDED:
- BRITESIL® C24 hydrous polysilicate 20.0%
- STPP 30.0%
- Sodium carbonate 10.5%
- C12-C15 linear alcohol, 7 moles EO 4.0%
- Sodium sulfate 24.0%
- CMC 1.0%
- LAS 10.0%
- Optical brightener, Perfume 0.5%

PHOSPHOROUS-FREE:
- VALFOR® 100 zeolite A 30.0%
- BRITESIL® C24 hydrous polysilicate 7.0%
- Sodium carbonate 15.0%
- Polyacrylate (MW 4500-5500) 1.0%
- C12-C15 linear alcohol, 7 moles EO 4.0%
- LAS 10.0%
- CMC 1.0%
- Optical brightener 0.5%
- Sodium sulfate 31.5%

AGGLOMERATED:
- STPP 30%
- Sodium carbonate 15%
- BRITESIL® C24 hydrous polysilicate 10%
- Sodium sulfate 31%
- LAS 7%
- RU® sodium silicate 7%

LOW-PHOSPHOROUS:
(Economy)
- VALFOR® 100 zeolite A 20%
- Sodium carbonate 25%
- STPP 5%
- Sodium sulfate 36%
- LAS 7%
- RU® sodium silicate 7%

(Premium)
- VALFOR® 100 zeolite A 27%
- STPP 5%
- Sodium carbonate 10%
- CMC 1%
- Sodium sulfate 29%
- LAS 12%
- C12-C15 linear alcohol, 7 moles EO 6%
- RU® sodium silicate 10%
**INDUSTRIAL CHEMICALS DIVISION**

**PHOSPHOROUS-FREE:**

*(Economy)*

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>VALFOR® 100 zeolite A</td>
<td>25.0%</td>
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<tr>
<td>Sodium carbonate</td>
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<tr>
<td>Sodium sulfate</td>
<td>35.5%</td>
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<tr>
<td>LAS</td>
<td>5.0%</td>
</tr>
<tr>
<td>Polyacrylate (MW 4500)</td>
<td>0.5%</td>
</tr>
<tr>
<td>C12-C15 linear alcohol, 7 moles EO</td>
<td>2.0%</td>
</tr>
<tr>
<td>RU® sodium silicate</td>
<td>7.0%</td>
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*(Premium)*

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<td>VALFOR® 100 zeolite A</td>
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<td>Sodium carbonate</td>
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<td>CMC</td>
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<td>Sodium sulfate</td>
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<tr>
<td>LAS</td>
<td>10.0%</td>
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<tr>
<td>C12-C15 linear alcohol, 7 moles EO</td>
<td>11.0%</td>
</tr>
<tr>
<td>RU® sodium silicate</td>
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**LAUNDRY BLEACHES (INDUSTRIAL & INSTITUTIONAL)**

**CHLORINE BASED:**

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<td>Sodium sulfate</td>
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<tr>
<td>METSO BEADS® 2048 sodium metasilicate</td>
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<tr>
<td>TSPP</td>
<td>8%</td>
</tr>
<tr>
<td>Calcium hypochlorite</td>
<td>50%</td>
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<tr>
<td>METSO BEADS® 2048 sodium metasilicate</td>
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<tr>
<td>Sodium chloride</td>
<td>30%</td>
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<tr>
<td>Chlorinated isocyanurate</td>
<td>18%</td>
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<tr>
<td>STPP</td>
<td>10%</td>
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<tr>
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<tr>
<td>Sodium sulfate</td>
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**OXYGEN BASED:**

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<th>Ingredient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium percarbonate</td>
<td>60%</td>
</tr>
<tr>
<td>METSO BEADS® 2048 sodium metasilicate</td>
<td>20%</td>
</tr>
<tr>
<td>Sodium carbonate</td>
<td>20%</td>
</tr>
</tbody>
</table>
MISCELLANEOUS (INDUSTRIAL & INSTITUTIONAL)

CARPET CLEANERS:
STPP 30.0%
Sodium carbonate 20.0%
Betaine derivative, anionic 2.9%
Sodium sulfate 17.0%
Optical brightener 0.1%
Fragrance Trace
METSO PENTABEAD® 20 sodium metasilicate 30.0%

LIQUID (SHAMPOO):
Water 62.5%
TSP 2.0%
STPP 5.0%
KASIL® #6 potassium silicate 20.0%
Phosphate ester, anionic 3.0%
Sodium alkylnapthalene sulfonate 3.5%
Octylphenol, 7-8 moles EO 4.0%

CARPET STEAM CLEANER:
Water 79.6%
METSO BEADS® 2048 sodium metasilicate 7.8%
Sodium xylene sulfonate (40%) 8.7%
C12-C15 linear alcohol, 12 moles EO 3.9%

DISINFECTANT CLEANER (POWDER):
Sodium carbonate 35%
STPP 30%
BRITESIL® H2O hydrous polysilicate 20%
Nonionic surfactant 10%
Germicide (quaternary compound) 5%

DRAIN CLEANER:
Water 71%
Sodium hydroxide (50%) 20%
METSO BEADS® 2048 sodium metasilicate 5%
Nonionic surfactant 4%

PAINT STRIPPERS:
LIQUID:
Water 40%
METSO BEADS® 2048 sodium metasilicate 10%
Biodegradable glucoside anionic 10%
Sodium hydroxide (50%) 40%

POWDER:
METSO PENTABEAD® 20 sodium metasilicate 48%
G® sodium silicate 50%
Sodium resinate 2%
WAX STRIPPERS:

**LIQUIDS:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>38.6%</td>
</tr>
<tr>
<td>C12-C15 linear alcohol, 3-4 moles EO</td>
<td>3.0%</td>
</tr>
<tr>
<td>ACUSOL 810*</td>
<td>8.3%</td>
</tr>
<tr>
<td>Potassium hydroxide (45%)</td>
<td>3.4%</td>
</tr>
<tr>
<td>TKPP (60%)</td>
<td>41.7%</td>
</tr>
<tr>
<td>KASIL® #6 potassium silicate</td>
<td>5.0%</td>
</tr>
<tr>
<td>Water</td>
<td>75%</td>
</tr>
<tr>
<td>METSO BEADS® 2048 sodium metasilicate</td>
<td>5%</td>
</tr>
<tr>
<td>Sodium hydroxide (50%)</td>
<td>1%</td>
</tr>
<tr>
<td>Diethanolamine</td>
<td>1%</td>
</tr>
<tr>
<td>EDTA, tetradsodium (37%)</td>
<td>6%</td>
</tr>
<tr>
<td>Dipropylene glycol monomethyl ether</td>
<td>4%</td>
</tr>
<tr>
<td>Phosphate ester</td>
<td>3%</td>
</tr>
<tr>
<td>Nonylphenol, 9-10 moles EO</td>
<td>5%</td>
</tr>
</tbody>
</table>

**POWDER:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>METSO PENTABEAD® 20 sodium metasilicate</td>
<td>35%</td>
</tr>
<tr>
<td>Sodium carbonate</td>
<td>30%</td>
</tr>
<tr>
<td>TSP</td>
<td>20%</td>
</tr>
<tr>
<td>Sodium alkylaryl sulfonate</td>
<td>15%</td>
</tr>
</tbody>
</table>

*Rohm and Haas Company

**MATERIAL SOURCES**

For the most complete listing of suppliers of ingredients for cleaner formulations, consult:

**Surfactants:**

*Emulsifiers & Detergents, North American Edition*

McCutcheon’s Publications
175 Rock Road
Glen Rock, NJ 07451
(201) 652-2655
www.gomc.com

**Functional Materials (All Other Ingredients):**

*Functional Materials*

McCutcheon’s Publications
(Same as above)

**Chemicals-General:**

*Chemical Week Buyer’s Guide*

Chemical Week
110 William St.
New York, NY 10038
(212) 621-4900
www.chemweek.com

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