Consumers are attracted to detergents that leave their clothes clean and stain-free, maintain the integrity of their clothing and that are highly dispersible, for a more efficient clean. Since consumers are looking for premium and concentrated detergents with multi-functional benefits that target their specific needs, Evonik has developed the perfect solution for liquid detergent formulators.

Evonik’s wide range of AEROSIL® fumed silica grades improve product form and appeal by offering targeted rheology control. These specialty ingredients control viscosity and suspension properties independently, which gives the formulator a high degree of flexibility. Formulations thickened or stabilized with AEROSIL® also have outstanding pourability driven by the thixotropic or shear-thinning nature of these thickeners.

### Low-water detergent test formulation

<table>
<thead>
<tr>
<th>Material</th>
<th>Weight percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomadol® 91-8</td>
<td>19%</td>
</tr>
<tr>
<td>BIO-SOFT® S 101 (neutralized)</td>
<td>38.63%</td>
</tr>
<tr>
<td>30% Sodium Citrate Solution (in water)</td>
<td>36.75%</td>
</tr>
<tr>
<td>Propylene Glycol</td>
<td>5.52%</td>
</tr>
<tr>
<td>Select AEROSIL® grade</td>
<td>0%–3%</td>
</tr>
</tbody>
</table>

### Viscosity effect of AEROSIL® grades on detergent test formulation

![Viscosity effect of AEROSIL® grades on detergent test formulation](image)

**Figure 1**  Viscosity of the test formulation with 3% of the AEROSIL® grades at a shear rate of 0.102 s⁻¹, measured on an Anton Paar MCR 302
Rheological curves showing shear-thinning behavior of test formulation

- Hydrophobic silica such as AEROSIL® R 974 achieves a high level of thickening efficiency.
- Hydrophilic silica like AEROSIL® 300 and 200 offers a balance between thickening and suspension properties.
- All silica grades show a desired shear-thinning profile for improved pourability.

Figure 2  Shear rate vs. viscosity for the test formulation with 3 % of the AEROSIL® grades, measured on an Anton Paar MCR 302

Wide range of AEROSIL® chemistries are available based on your formulation needs

- AEROSIL® 200
- AEROSIL® COK 84
- AEROSIL® R 816
- AEROSIL® R 974
- AEROSIL® R 202
- AEROSIL® R 812

AEROSIL® can be a powerful formulation aid that:
- Prevents suspended particles from settling.
- Improves filling efficiency of unit dose packs.
- Has compatibility and synergies with surfactant systems.
- Stabilizes highly acidic formulations.
- Delivers a desired shear-thinning profile for improved pourability.

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