Selvol Ultiloc is a series of patented copolymers that expand on the functionality of industry trusted Selvol Polyvinyl Alcohol products. These new grades offer a variety of characteristics ranging from higher adhesion and crosslinking, to faster dissolution and low temperature solubility when compared to traditional polyvinyl alcohol products. Selvol Ultiloc copolymers can bring added efficiency and improved utility to applications including adhesives, emulsions, construction, coatings, flexible packaging, and many innovative application segments still on the horizon.

Sekisui Specialty Chemicals is dedicated to providing chemical solutions for the future. We own several key patents that support the Selvol Ultiloc technologies.

**Patents**

<table>
<thead>
<tr>
<th>Product</th>
<th>Related Patents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selvol Ultiloc 5103</td>
<td>US5300566</td>
</tr>
<tr>
<td>Selvol Ultiloc 5003</td>
<td>US9271920, EP2326674, JPS669738</td>
</tr>
<tr>
<td>Selvol Ultiloc 4005</td>
<td>US Notice of Allowance 7/30/2018</td>
</tr>
</tbody>
</table>

**Ultiloc Series**

<table>
<thead>
<tr>
<th>Product</th>
<th>Viscosity (cps)</th>
<th>Degree of Hydrolysis (mol %)</th>
<th>Volatiles (wt % max)</th>
<th>VOC (wt % max)</th>
<th>Ash (wt % max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selvol Ultiloc 5103</td>
<td>5.0-10.0</td>
<td>Fully h.</td>
<td>5</td>
<td>3.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Selvol Ultiloc 5003</td>
<td>5.0-10.0</td>
<td>Fully h.</td>
<td>5</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Selvol Ultiloc 4005</td>
<td>9.0-10.0</td>
<td>Fully h.</td>
<td>5</td>
<td>3.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Selvol Ultiloc 2012</td>
<td>10.0-14.0</td>
<td>Fully h.</td>
<td>6</td>
<td>2.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>

1. 4% Aqueous Solution, 20°C  2. As % Na2O, Corrected Volatiles

**Customer Commitment**

Selvol Ultiloc copolymers have undergone thorough analysis to validate their characteristics and benefits. Sekisui Specialty Chemicals has a wide array of testing equipment and methodologies available to qualify application feasibility, assist in formulation, and suggest adjustments. Our knowledgeable specialists are ready and excited to support our customers in creating tomorrow’s popular products.

**Sekisui Specialty Chemicals**

*A new frontier, a new lifestyle.*

Sekisui Specialty Chemicals is part of the Sekisui Chemical Group, a multibillion dollar global company that delivers a wide range of products and services to enrich people’s lives. Sekisui has been striving to ‘produce a better world with creative technologies’ since its formation in 1947. The company is comprised of core businesses and technologies in housing, social infrastructure, and chemical solutions. Selvol Ultiloc copolymers are the latest example of the depth and breadth of Sekisui Chemical Group’s innovative contributions to these key business fields.
As part of our Specialty Products range, Selvol Ultiloc copolymers combine chemistries to demonstrate properties unlike those of standard Selvol polymers, allowing for uses within a number of new industries.

Selvol Ultiloc copolymers can be utilized in a wide range of applications areas, including building & construction products, emulsions, adhesives, coatings, textiles, paper, flexible packaging, inks, ceramics, personal care and specialty applications. Sekisui Specialty Chemicals’ R&D program is committed to expanding this specialty product range to incorporate further industries and applications.

Copolymers that expand on the functionality of the industry trusted Selvol Polyvinyl Alcohol products

**Selvol Ultiloc 2012**
Polyvinyl Alcohol/Vinyl CO-AMPS Copolymer
Chemical Structure

Properties vs Standard PVOH
- Copolymer is stable over wide pH range.
- Lower temperature solubility and quicker dissolution process.
- Improved thermal stability.
- Lower melt temperature.

**Selvol Ultiloc 4005**
Polyvinyl Alcohol/Vinyl Pyrrolidone Copolymer
Chemical Structure

Properties vs Standard PVOH
- Greater film flexibility.
- Increased moisture retention.
- Lower temperature solubility and quicker dissolution process.

**Selvol Ultiloc 5003**
Polyvinyl Alcohol/Vinyl Amine Copolymer
Selvol Ultiloc 5003 Chemical Structure

Properties vs Standard PVOH
- Higher reactivity – leading to improved crosslinking or post reactions.
- Improved adhesion to wide variety of substrates, including difficult/low energy surfaces.
- Effective additive for improving adhesion characteristics in emulsion based adhesives.
- Lower temperature solubility and quicker dissolution process.

**Selvol Ultiloc 5103**
Polyvinyl Alcohol/Vinyl Formamide Copolymer
Selvol Ultiloc 5103 Chemical Structure

Properties vs Standard PVOH
- Slightly improved adhesion to substrates/difficult surfaces.
- Lower temperature solubility and quicker dissolution process.