Vinisol is a high performance soluble vinyl polymer that can be used alone or in combination with other polymers, including acrylates, urethanes, alkyds and other resins. These vinyl resins are supplied as dry powders and in different molecular weights and compositions.
Quality and Reliability

WWP is a Brazilian company founded in 1999 by two partners, an Engineer that spent most of his professional career in the industrial area of “Grupo Odebrecht (Brazil)”, now called Braskem, and retired as Vice-President of industrial operations, and the other a Chemist and Engineer, specialized in the area of vinyl resins technology who spent most of his career in the areas of research, development and production engineering at Occidental Chemical, in the USA.

Some years later they were joined by a third partner, with wide experience in communication, foreign marketing and administration. The three partners are the Directors of WWP.

WWP’s Directors and staff have a broad range of experience in areas related to Industrial Production, Research & Development and Marketing of Vinisol line (solution vinyl resins).

The main goals of WWP are the development, optimization of technology and the distribution of added value vinyl copolymers and terpolymers resins with an excellent cost/benefit ratio.
Vinisol is a line of high performance soluble vinyl resins obtained through suspension polymerization processes. Their characteristics and properties are shown bellow:

• They are copolymers or terpolymers resins of vinyl chloride, vinyl acetate and other monomers;
• They have low molecular weight, small particle size and high bulk density;
• They produce transparent, colorless, high brightness solution and excellent finish on the surface of the end product;
• They are sold as dry powders, and are soluble in a wide range of organic solvents, such as MEK, MIBK and other types of ketones. They can be applied using a brush, spray or printing rollers;
• They are homogeneous in specification lot-to-lot.
**Primers**

Vinisol resins can be formulated in high quality primers which have excellent adhesion to a variety of substrates, including plastics, metals, and aluminum foils.

**Packaging Adhesives**

Used to seal “blister-type” packages for food and certain pharmaceutical products. Vinisol resin functions as the adhesive layer between aluminum foil polymer substrates in “easy open” food and beverage packaging.

**Paints and Varnishes**

Suitable for formulation of paints and varnishes used for footwear, automotive plastic parts, laminates, wall paper, PVC and PU substrates, and many others, due to its excellent finish and adhesion.
Coatings

In coating/finishing applications on wood, metal, plastic and aluminum, Vinisol resins provide protection against salinity, acidity and alkalinity.

Other applications

Due to their versatility in formulation, adhesion and surface finish, Vinisol can be used in applications that require durability, resistance to abrasion, and when properly formulated, resistance to organic solvents.
Vinyl chloride and vinyl acetate copolymer resin. Vinisol WPHH is used in applications that require excellent solubility. It is compatible with other vinyl chloride-based polymers, as well as almost all types of vinyl acetate-based polymer and acrylates. The composition of Vinisol WPHH complies with **US FDA regulation 21 CFR 175.300** for use in direct contact with food provided the restriction that maximum thickness of the coating is 8 microns.

Vinyl chloride, vinyl acetate and hydroxy propyl acrylate terpolymer resin. Vinisol WPOH is used in applications that require excellent solubility and with hydroxyl functionality (“OH”). The presence of hydroxyl groups increase compatibility with several other types of polymers, including certain alkyd resins and polyurethanes. The presence of the hydroxyl group in the molecule allows “crosslinking” in systems (“two-component”) that require excellent adhesion, flexibility, hardness and chemical resistance. Paints prepared with this resin show good adhesion to wood, paper and plastic.

VINISOL WPCA is Vinyl Chloride, Vinyl Acetate and Fumaric Acid terpolymer resin. VINISOL WPCA is used in applications that require excellent solubility and functionality of the fumaric acid group. Fumaric acid in the polymer reacts to form a strong ionic bond with many metallic substrates. VINISOL WPCA films show an excellent adhesion to metal parts, including aluminum, steel and galvanized iron. The composition of Vinisol WPCA complies with **US FDA regulation 21 CFR 175.300** for use in direct contact with food provided the restriction that maximum thickness of the coating is 8 microns.
Applications (WPHH)
- Silkscreen printing inks;
- Printing inks for plastic films;
- Decorative paints for vinyl toys;
- Adhesives, varnishes and vinyl paints in general;
- Adhesives for cardboard for “blister” type packages.

Applications (WPOH)
- Paints for polyurethane (PU) footwear;
- Printing inks for packaging and PVC substrates;
- Anticorrosive paints and/or with high chemical resistance;
- Printing inks for leather, paper and plastics;
- Wood paints of “primer/sealer” type for furniture;
- Primer for automotive plastic parts.

Applications (WPCA)
- Adhesive for “blister” type packaging for pharmaceutical products;
- Medical use aluminum foils coatings, galvanized tin coating;
- Metal food can linings, and maintenance and marine coatings;
- Metallic paints;
- Primer for metals.
Remark: WPCA has higher maximum adhesion compared to WPCH.
Technical Specification

Vinisol

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinyl Chloride Content</td>
<td>%</td>
<td>FT-R Method</td>
</tr>
<tr>
<td>Vinyl Acetate Content</td>
<td>%</td>
<td>FT-R Method</td>
</tr>
<tr>
<td>Hydroxy Propyl Acrylate Content</td>
<td>%</td>
<td>FT-R Method</td>
</tr>
<tr>
<td>Fumaric Acid Content</td>
<td>%</td>
<td>Kaneka Method</td>
</tr>
<tr>
<td>Volatile Matter</td>
<td>%</td>
<td>JIS K0492</td>
</tr>
<tr>
<td>Brokfield Viscosity in MEK(1)*</td>
<td>mPa•s</td>
<td>Kaneka Method</td>
</tr>
<tr>
<td>Brokfield Viscosity in Ethyl Acetate(2)</td>
<td>mPa•s</td>
<td>Kaneka Method</td>
</tr>
<tr>
<td>Film Aspect / Solution Appearance(3)</td>
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<td>Kaneka Method</td>
</tr>
<tr>
<td>Average Molecular Weight</td>
<td>-</td>
<td>GPC Method</td>
</tr>
</tbody>
</table>

Note: * All values above are preliminary and subject to change.

(1) Brookfield Viscometer - 60rpm, 30s, BM model spindle #2. The solution is prepared at 20% in MEK (Methyl Ethyl Ketone), heated to 30°C for 20 minutes and cooled to room temperature 24 hours.

(2) Brookfield Viscometer - 60rpm, 30s, BM model spindle #2. The solution is prepared at 20% in Ethyl Acetate, heated to 30°C for 20 minutes and cooled to room temperature 24 hours.

(3) Solution described in number 1 and spread on a glass plate.

Disclaimer: The data and information contained in this catalog represent our current knowledge, and serve only as a guide for product applications. In case of doubt about specific applications, please contact WWP: wwp@vinisol.com.br

Grades

<table>
<thead>
<tr>
<th>Grades</th>
<th>WP</th>
<th>HH</th>
<th>OH</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>WP</td>
<td>83,0 ± 2,0</td>
<td>81,0 ± 4,0</td>
<td>81,0 ± 2,5</td>
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<tr>
<td>HH</td>
<td>17,0 ± 2,0</td>
<td>11,0 ± 2,0</td>
<td>18,0 ± 2,0</td>
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</tr>
<tr>
<td>OH</td>
<td>-</td>
<td>8,0 ± 1,0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>-</td>
<td>-</td>
<td>1,0 ± 0,5</td>
<td></td>
</tr>
</tbody>
</table>

Solubility Parameters

Solvents that provide better solubility to dissolve Vinisol resins are Ketones (Ketone, Cyclohexanone, MIBK, MEK, Isophorone, etc). Other solvents, despite being less efficient, can also be used to solubilize Vinisol resins.

“Solubility parameters of solvents normally used with Vinisol resins”

<table>
<thead>
<tr>
<th>Solubility Parameters</th>
<th>Polarity</th>
<th>Dispersion</th>
<th>Hydrogen Affinity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dP = 10,0</td>
<td>dD = 7,4</td>
<td>dH = 7,4</td>
</tr>
</tbody>
</table>

Values in (J/cm³)²
Important: Following this procedure correctly is important to obtain the best possible solution.

1. Use a high-speed Cowles-type disperser;
2. Add enough solvent to obtain a mixture of 40% resin and 60% solvent;
   Note: In case of a combination of solvents, add the true (more active) solvent first.
3. Turn on the mixer and add Vinisol resin slowly to avoid the formation of agglomerates;
4. Add heat stabilizer (if needed);
5. Mix until the mass heats up to approximately 55°C. Keep mixing at this temperature for 5 (five) minutes;
6. Add the rest of the true solvent;
7. Add the other solvents and additives.
   Note: The total time required to form a solution may vary, depending on the mixer speed and/or cowles diameter.

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**Recommended parameters of preparation of a Vinisol solution**

Vinisol is supplied in plastic bags of 22.68 kg (50 lbs). The bags must be stored at temperatures under 35°C, away from direct sunlight exposure, stored at a well ventilated, cool and dark place and kept on pallets to avoid direct contact with the floor.

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**Package and Storage Conditions**

Refer to MSDS (Material Safety Data Sheet), available at WWP web page: www.vinisol.com.br

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**Safety data**

One year under recommended storage conditions above.
WWP - Exclusive Distributor of Vinisol line

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Technical information: www.vinisol.com.br