Elastic Sealing, Bonding and Coating for Transportation
Elastic Sealing, Bonding and Coating Solutions

Excellent weathering and aging resistant adhesives, specifically engineered to withstand high mechanical stress in elastic bonding applications.

The use of LOCTITE® and TEROSON® elastic sealing, bonding and coating solutions opens up new applications as they satisfy high modern design and cost-efficiency demands. These reliable adhesives can be applied in a variety of applications of component manufacturing and assembly.

The LOCTITE® and TEROSON® polyurethanes and silane-modified polymers (SMPs) offer choices to fit most considerations for elastic bonding applications. The polyurethanes offer proven performance with well-known technology for faster cure, high elongation and excellent tensile strength for semi-structural applications. Products incorporating SMP technology are moisture-curing and react to form high-performance elastomers. They contain a built-in adhesion promoter (primer). This gives an extremely broad adhesion spectrum, making them compatible with different substrates – in many cases, they can be applied without an additional primer.

### BENEFITS
- Primerless adhesion
- Wide application spectrum
- Broad range (sealants, adhesives, coatings) for standard and tailor-made solutions
- High-quality grades

### PRODUCT FEATURES
- Solvent-free
- Good aging properties
- High UV and weather stability
- Wide adhesion spectrum on metals, paints, plastics and composites
- Low shrinkage during curing
- Elastic behavior
- Flame retardant (special formulations)

### INDUSTRY
- Passenger cars
- Buses and coaches
- Trucks
- Sub-suppliers

<table>
<thead>
<tr>
<th>ELASTIC SEALING</th>
<th>ELASTIC BONDING</th>
<th>ELASTIC COATING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEFINITION</strong></td>
<td>Bonding of materials with same or different elongation coefficients. Possible tensions can be compensated by LOCTITE® and TEROSON® MS products, which also absorb oscillations and vibrations</td>
<td>Elastic and resilient coating for surface protection</td>
</tr>
<tr>
<td>Elastic, adherent, thixotropic or self-leveling sealing of seams, cross joints, overlap joints, connecting joints</td>
<td>Bonding of planking, lining, sheet plates</td>
<td></td>
</tr>
<tr>
<td><strong>APPLICATION AREAS</strong></td>
<td>Fixing of plastic or metal ledges, plates or structural elements on housings</td>
<td>Protective coating on metals (aluminum, steel, others), composites, glass and plastics</td>
</tr>
<tr>
<td>&gt; Sealing of seams, sheet metal overlaps and border joints</td>
<td>Bonding of sandwich and insulation plates</td>
<td>Corrosion protection of riveted joints or screw joints</td>
</tr>
<tr>
<td>&gt; Sealing of flanged joints</td>
<td>Bonding of exterior panels and fascia</td>
<td></td>
</tr>
<tr>
<td>&gt; Cars, vans and buses</td>
<td>Bonding of liftgates, tailgates for Sheet-Molded Compound (SMC), Thermoplastic Olefin (TPO), Polypropylene (PP) and other multi-material surfaces</td>
<td></td>
</tr>
<tr>
<td><strong>ADVANTAGES</strong></td>
<td>Elastic</td>
<td>Elastic</td>
</tr>
<tr>
<td>&gt; Elastic</td>
<td>&gt; Elastic</td>
<td>&gt; Elastic</td>
</tr>
<tr>
<td>&gt; Wide, primerless adhesion on many substrates</td>
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</tr>
<tr>
<td>&gt; Fast curing</td>
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<tr>
<td>&gt; Low volume shrinkage during curing</td>
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<td>&gt; Low volume shrinkage during curing</td>
</tr>
<tr>
<td>&gt; Easy processing</td>
<td>&gt; Easy processing</td>
<td>&gt; Easy processing</td>
</tr>
<tr>
<td>&gt; Good UV and weather resistance for SMP adhesives</td>
<td>&gt; Good UV and weather resistance for SMP adhesives</td>
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</tr>
<tr>
<td>&gt; Thixotropic or self-leveling</td>
<td>&gt; No contact corrosion</td>
<td>&gt; High impact strength</td>
</tr>
<tr>
<td>&gt; Replacement of screws and welding wires</td>
<td></td>
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</tbody>
</table>

2
Curing Methods

Two Cure Methods for Elastomeric Adhesives and Sealants

1K-System

- Ambient Moisture
- Mixing: Static or dynamic
- Curing: From Outside In

Conventional 2K-System

- Mixing: Static or dynamic
- Curing: Homogeneous

Ratings Scale

<table>
<thead>
<tr>
<th>ADHESIVES AND SEALANTS COMPARED</th>
<th>SILANE-MODIFIED POLYMERS</th>
<th>POLYURETHANES*</th>
<th>SILICONES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesion to All Material</td>
<td>•••</td>
<td>••</td>
<td>••</td>
</tr>
<tr>
<td>Elasticity</td>
<td>•••</td>
<td>••</td>
<td>••</td>
</tr>
<tr>
<td>Easy to Extrude</td>
<td>•••</td>
<td>••</td>
<td>•••</td>
</tr>
<tr>
<td>Paint Compatibility</td>
<td>•••</td>
<td>••</td>
<td>•••</td>
</tr>
<tr>
<td>UV Resistance</td>
<td>•••</td>
<td>••</td>
<td>•••</td>
</tr>
<tr>
<td>Adhesion to Wet Surfaces</td>
<td>•••</td>
<td>••</td>
<td>•••</td>
</tr>
<tr>
<td>Easy to Clean</td>
<td>•••</td>
<td>••</td>
<td>•••</td>
</tr>
<tr>
<td>No Solvents, No Odor</td>
<td>•••</td>
<td>••</td>
<td>•••</td>
</tr>
</tbody>
</table>

* For a lower-cost alternative, Henkel offers new one-part polyurethanes.

Rating Key: Excellent ••• Good •• Fair •
Joining Methods

Overview

Structural bonding is a process in which two materials are solidly and permanently assembled using an adhesive. Adhesives build “bridges” between the surfaces of substrates to be joined.

To achieve the optimal bonding result, the following premises must be met:
- Compatibility of the adhesive with the materials to be bonded
- Compatibility of the adhesive with the specified requirements
- Correct processing of the adhesive

Benefits of Adhesive Bonding vs. Conventional Joining Methods

1. **Uniform stress distribution over the entire bonding surface.**
   - Positive effect on the static and dynamic strength.
   - Saves production costs by replacing conventional mechanical fasteners (screws, rivets or welding).

2. **No change in surface and texture of joined materials.**
   - Welding temperatures change the texture and, therefore, the mechanical properties of materials.

3. **Weight saving.**
   - Adhesives are perfect for lightweight constructions, where thin-walled parts (wall thickness < 0.5 mm) must be joined.

4. **Adhesives act as sealants.**
   - Prevent loss of pressure or liquids.
   - Block the penetration of condensing water.
   - Protect against corrosion.

5. **Joining different materials.**
   - Adhesive forms an insulating layer.
   - Prevention of contact corrosion in most cases.
   - Electrical and thermal insulator.
Flexible Bonding

Stress Distribution

Flexible bonding is a highly efficient and reliable technique for joining parts; it is widely accepted by automotive original equipment manufacturers and suppliers.

Elastic adhesives combine the advantages of bonding and sealing in one single operation. Flexible adhesives:

- Prevent corrosive media entering or leaking from assemblies, even in wider joints or gaps.
- Create a friction-locked joint of mating parts by means of adhesion to the substrates and inherent strength or cohesion within the adhesive itself.
- Are selected for their capability of absorbing and/or compensating dynamic stresses.
- Exhibit a high inherent strength (cohesion) and a high modulus, achieving friction-locked joints which, at the same time, have elastic properties.

Benefits of Flexible Bonding

- Simplified design by increasing strength to withstand dynamic loads.
- Prevents material fatigue and failure by achieving uniform transmission of the load and by maintaining the structural integrity (no thermal or mechanical weakening of parts).
- Saves production costs by replacing conventional mechanical fasteners (screws, rivets or welding).
- Allows the most varied substrate combinations (e.g., metal/plastic, metal/glass, etc.), and reduces and/or compensates for stress caused by differential thermal expansion of joint substrates.
- Compensates for the tolerances of the parts to be joined.
Sealing

Safe, Reliable and Trouble-Free
The safety and reliability of most applications often strongly depend on which components are joined together, on a reliable seal created between these parts, and on the trouble-free, consistent performance of the sealants used.

Suitable sealants:
- Prevent possible damage by protecting against unfavorable environmental influences, penetration or leakage of hazardous materials and gases, corrosion, etc.
- Allow simplified designs and provide improved appearance.

Benefits of Sealing
Sealants form a “bridge” between different part surfaces.
- The strength of a bond depends upon adhesion of the sealant to the surface of the substrate and cohesion (strength within the sealant itself).
- The physical and chemical properties of sealants depend to a large extent on the selected raw material basis.
- Elastic sealants have a high elongation of >200%.
- Sealants have reversible deformation with a high recovery rate of >70%.
- Plastic sealants display only slight or no recovery and low admissible total deformation (<5%).

Elastomeric Adhesive Products

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>CHEMISTRY</th>
<th>APPLICATION</th>
<th>COLOR</th>
<th>CONSISTENCY</th>
<th>DENSITY GRAMS/ML</th>
<th>SHORE A HARDNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCTITE® 3370™</td>
<td>1K Polyurethane</td>
<td>Bonding</td>
<td>Black, White, Grey</td>
<td>Paste</td>
<td>1.13-1.18</td>
<td>&gt;38</td>
</tr>
<tr>
<td>LOCTITE® 5510™</td>
<td>1K SMP</td>
<td>Sealing</td>
<td>Clear, Grey, Black, White</td>
<td>Paste</td>
<td>1.03-1.11</td>
<td>–44</td>
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<tr>
<td>LOCTITE® 5570™</td>
<td>1K SMP</td>
<td>Sealing</td>
<td>Clear, White</td>
<td>Paste</td>
<td>1.28-1.44</td>
<td>–53</td>
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<tr>
<td>LOCTITE® 5590™</td>
<td>2K SMP</td>
<td>Sealing</td>
<td>Black</td>
<td>Paste</td>
<td>–1.4</td>
<td>–46</td>
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<tr>
<td>LOCTITE® UK 1366 B10™</td>
<td>2K Polyurethane</td>
<td>Bonding</td>
<td>Beige/Green</td>
<td>Liquid</td>
<td>1.42</td>
<td>–55</td>
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<tr>
<td>TEROSON® MS 930™</td>
<td>1K SMP</td>
<td>Bonding</td>
<td>White, Grey, Black</td>
<td>Paste</td>
<td>1.5</td>
<td>30</td>
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<tr>
<td>TEROSON® MS 939™</td>
<td>1K SMP</td>
<td>Bonding</td>
<td>White, Grey, Black</td>
<td>Paste</td>
<td>1.5</td>
<td>55</td>
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<tr>
<td>TEROSON® MS 9360™</td>
<td>1K SMP</td>
<td>Sealing</td>
<td>Black</td>
<td>Paste</td>
<td>1.32-1.42</td>
<td>50-60</td>
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<tr>
<td>TEROSON® PU 860™ ME</td>
<td>2K Polyurethane</td>
<td>Bonding</td>
<td>Grey</td>
<td>Paste</td>
<td>1.16</td>
<td>n/a</td>
</tr>
<tr>
<td>TEROSON® PU 1510™</td>
<td>1K Polyurethane</td>
<td>Bonding</td>
<td>Black</td>
<td>Paste</td>
<td>1.5</td>
<td>–90</td>
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</table>

* Note: Data in this chart represents typical performance.
## Elastomeric Equipment

### LOCTITE® PRODUCT

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Type Used to Dispense</th>
<th>Package Type &amp; Size</th>
<th>Pressure Regulation</th>
<th>Viscosity Range</th>
<th>Low-Level Sensing</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNEUMATIC CARTRIDGE DISPENSING - ONE-PART</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1046901</td>
<td>Silicones, Polyurethanes, SMP Adhesives</td>
<td>300 ml Cartridges</td>
<td>0 to 725 psi</td>
<td>Low to High</td>
<td>Yes</td>
</tr>
<tr>
<td>1714370</td>
<td>Gel Cyanoacrylates, Anaerobic Gasketing, Light Cure/Acrylics and Silicones</td>
<td>300 ml Cartridges</td>
<td>0 to 60 psi</td>
<td>Medium to High</td>
<td>No</td>
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<tr>
<td>98319A</td>
<td>Gel Cyanoacrylates, Anaerobic Gasketing, Light Cure/Acrylics and Silicones</td>
<td>300 ml Cartridges</td>
<td>0 to 60 psi</td>
<td>Low to Medium</td>
<td>No</td>
</tr>
<tr>
<td>98022</td>
<td>Gel Cyanoacrylates, Anaerobic Gasketing, Light Cure/Acrylics and Silicones</td>
<td>300 ml Cartridges</td>
<td>0 to 50 psi</td>
<td>Medium</td>
<td>Yes</td>
</tr>
<tr>
<td>PNEUMATIC CARTRIDGE DISPENSING - TWO-PART</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500890</td>
<td>Two-Component Epoxies, Urethanes and Methacrylates</td>
<td>400 ml Cartridge</td>
<td>1:1, 2:1</td>
<td>High to Paste</td>
<td>Pneumatic</td>
</tr>
</tbody>
</table>

### HIGH VISCOSITY FLUID & PASTE VALVES

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Type</th>
<th>Viscosity Range</th>
<th>Dispense Patterns</th>
<th>Stroke Adjustment</th>
<th>Suck-Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQ VA25 Dispense Valve - 50 Bar</td>
<td>High Viscosity Fluid and Paste Valves</td>
<td>Low to High</td>
<td>Drop, Bead</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>1838885</td>
<td>High Viscosity Fluid and Paste Valves</td>
<td>Low to High</td>
<td>Drop, Bead</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High Pressure Dispense Valve - 150 Bar</td>
<td>High Viscosity Fluid and Paste Valves</td>
<td>Low to High</td>
<td>Drop, Bead</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### YOUR EQUIPMENT SOURCE

For more details, see the LOCTITE® Equipment Sourcebook, LT-3669, or visit us on the web for additional information, diagrams, products and our full line of equipment at [www.equipment.loctite.com](http://www.equipment.loctite.com).
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