HEALTHCARE | MEDICAL ADHESIVES

MEDICAL SILICONE ADHESIVES
EXPERIENCE MULTIMEDIA
PRODUCT INNOVATIONS

As an innovative chemical company, WACKER develops intelligent solutions that satisfy customer needs and also contribute significantly to a higher quality of life worldwide.

Clearly focused on the future, we intend to continuously enhance the quality of our products and improve our services. Close, two-way customer relationships play an essential role here. In today’s digital age, electronic media are the main channel for enabling both this direct exchange and our modern brand communications.

We want to use these state-of-the-art media to present our product innovations and solutions to you in an even better, more fascinating way.

Enter the Multimedia World of WACKER with WACKER Square

Our “WACKER Square” app delivers in-depth news about products, industries and the WACKER Group to your mobile device and – with a click on “MyOrders” – directly to your home. Alongside high-quality videos, images and press releases, the app offers you comprehensive brochures for your personalized “MySquare” media collection – and for subsequent offline use or for sharing with others.

You can also use our “WACKER Square AR” app. It allows you to experience augmented-reality applications firsthand. Be amazed by previously unimaginable insights as augmented reality merges reality, visions of the future and knowledge – adding value through information.

It’s so easy:

Download the WACKER Square AR app  Open  Scan  Experience
DISCOVER A BROAD RANGE OF MEDICAL APPLICATIONS IN 3D

For more detailed information, use our WACKER Square AR app. With your mobile device, just scan the printed graphics marked with this sign "AR".

Why not experience this new application right away, on this page?

Access an interactive overview of our silicone applications  
Navigate within the orbitals  
Click on an application to discover more
Regardless of the challenges the future holds, SILPURAN® offers you a future-proof solution that satisfies the highest medical standards.

The average age of the population is increasing steadily. As more and more people gain access to modern healthcare, statutory requirements for medical products and services are becoming stricter.

As a result, the healthcare industry faces ever-increasing demands with regard to the safety and efficiency of its solutions. WACKER’s contribution to this development is SILPURAN®: the future-proof, pure silicone that meets the most rigorous medical demands.

WACKER began conducting research on silicones back in 1947, laying the foundation for its success story as a European pioneer of silicone chemistry. Today, Wacker Chemie AG is one of the world’s leading silicone manufacturers, whose investments in research and development exceed the industry average, enabling innovations that blaze a trail to the future.

WACKER’s internal raw materials network ensures the future availability of raw materials, guaranteeing the finest quality and maximizing traceability back to the original source. This provides the ideal basis for further processing in accordance with stringent quality criteria.

WACKER CLEAN OPERATIONS guarantees outstanding purity for the medical requirements of today and tomorrow. WACKER’s cleanrooms meet Cleanroom Class 8 requirements for medical applications and are ISO 14644 certified.

SILPURAN® – in the Coating Process

- **Application**
  - The coating process involves applying the silicone adhesive on the carrier using a doctor blade, slot die or similar tool

- **Curing**
  - The adhesive cures at room temperature, but the process can be accelerated by increasing the temperature up to 120 °C

- **Cover**
  - The material composite can be finished once the silicone adhesive layer has been covered
SILPURAN® – Perfect Adhesion for Sensitive Medical Applications

WACKER silicones satisfy the highest medical standards and offer unique processing advantages. With their varying adhesive strength and properties that support the healing process, SILPURAN® adhesives are more than just the perfect treatment for wounds and scars – they are also suitable for any applications requiring a secure fixation, patient comfort and easy removal.

Optimal Wound Healing
Modern wound dressings must meet specific requirements, such as breathability or an optimal healing environment, and protection from external influences like bacteria and moisture. The soft, flexible silicones in the SILPURAN® product line are ideally suited for use as skin adhesives, because their properties provide optimal support for the healing process.

Minimal Pain, Maximum Quality of Life
40% of patients who live with a chronic wound described the pain of changing the dressing as their greatest problem. * Dressings that use silicone adhesives from WACKER make bandage removal a gentle process. Pain is therefore less of a factor in changing dressings, which reduces the stress to the patient caused by the anticipation of pain. At the same time, their permeability to water vapor and gases creates an ideal environment for healing.

As a result, SILPURAN® adhesives help shorten the healing period and reduce pain, noticeably improving patient quality of life.

A Strong Fixation, but Still Flexible
Technical developments in medicine are advancing at a steady pace. Portable devices for monitoring patients or administering medications are already making daily life easier for many people. And WACKER silicone adhesives reliably hold wearable technology like this in place. Thanks to its excellent adhesive strength, SILPURAN® adhesives deliver a secure fixation, and can be gently removed and repositioned. Their outstanding properties also make these products suitable for use in traditional wound care, in medical adhesive tapes and in stoma care.

Benefits of SILPURAN® Adhesives from WACKER:
- FDA Device Master Files (MAFs)
- Selected tests meeting ISO 10993 and USP Class VI requirements
- Efficient curing processes
- Economical processing
- Excellent bonding properties
- Stable at temperatures from -50 to +200 °C
- Long shelf life
- Enhanced performance

Please contact your local WACKER SILICONES sales partner for further information on SILPURAN® silicone adhesives for medical applications.

www.wacker.com/medical-adhesives

*Smeame S et al., Ostomy Wound Management, 2003*
Adhesive Properties of SILPURAN® Skin Adhesives

The peel adhesion and initial tack force of SILPURAN® skin adhesives cover a broad range, making them suitable for a wide variety of challenges that medical adhesives have to meet.

The atraumatic release properties of SILPURAN® adhesives have been demonstrated in skin tests – even for high adhesive strengths. When the adhesive silicone gel is removed, the upper layers of skin remain intact (B), whereas an acrylate adhesive of comparable strength clearly pulls away the upper layer of cells (A).
### Adhesive Properties of SILPURAN® Skin Adhesives

**SILPURAN® – Medical Skin Adhesives**

Medical Silicones for a Variety of Challenges

<table>
<thead>
<tr>
<th>Adhesive Strength</th>
<th>Product Name</th>
<th>Viscosity A* [mPa s]</th>
<th>Viscosity B* [mPa s]</th>
<th>Penetration [1/10 mm]</th>
<th>Adhesive Strength** [N/2.5 cm]</th>
<th>Tack [N]**</th>
<th>Pot Life at 23 °C [min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>SILPURAN® 2130</td>
<td>1,100</td>
<td>1,000</td>
<td>220</td>
<td>1.8</td>
<td>55</td>
<td>74</td>
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<tr>
<td>Medium</td>
<td>SILPURAN® 2100</td>
<td>34,000</td>
<td>35,500</td>
<td>205</td>
<td>2.7</td>
<td>54</td>
<td>73</td>
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<tr>
<td></td>
<td>SILPURAN® 2112</td>
<td>11,600</td>
<td>11,500</td>
<td>225</td>
<td>2.6</td>
<td>55</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>SILPURAN® 2117</td>
<td>33,000</td>
<td>33,000</td>
<td>210</td>
<td>3.0</td>
<td>63</td>
<td>40</td>
</tr>
<tr>
<td>Strong</td>
<td>SILPURAN® 2114</td>
<td>12,000</td>
<td>10,000</td>
<td>200</td>
<td>3.5</td>
<td>66</td>
<td>70</td>
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<tr>
<td></td>
<td>SILPURAN® 2122</td>
<td>3,200</td>
<td>2,700</td>
<td>180</td>
<td>5.5</td>
<td>59</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>SILPURAN® 2142</td>
<td>80,000</td>
<td>40,000</td>
<td>140</td>
<td>7.5</td>
<td>58</td>
<td>90</td>
</tr>
</tbody>
</table>

### SILPURAN® – Secure Adhesive for Medical Components

<table>
<thead>
<tr>
<th>Application</th>
<th>Product Name</th>
<th>Viscosity [mPa s]</th>
<th>Final Hardness Shore A (ISO 868)</th>
<th>Tensile strength (ISO 37) [N/mm²]</th>
<th>Elongation at break (ISO 37) [%]</th>
<th>Tear strength (ASTM D 624 B) [N/mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substrate bonding</td>
<td>SILPURAN® 4200</td>
<td>200,000</td>
<td>35</td>
<td>5.5</td>
<td>300</td>
<td>10</td>
</tr>
</tbody>
</table>

* For standard specifications and technical parameters, refer to the technical data sheet
** On stainless steel

All figures are intended as a guide and should not be used in preparing specifications.
Measurement conditions for penetration: hollow cone 62.5 g, 60 sec.
Silicones used in medical applications are in direct contact with the human body and must therefore fulfill extremely rigorous requirements. Our cutting-edge WACKER CLEAN OPERATIONS production standard, which takes into account selected GMP criteria, ensures that all SILPURAN® products meet modern medicine’s ever-increasing safety requirements. This means we can verify purity, tracing it from the end product back to the raw-material source.

In addition, the SILPURAN® product line also offers certification based on selected tests meeting ISO 10993, USP Class VI, and FDA Device Master File (MAF) standards.

SILPURAN® contains only precisely-defined ingredients, such as siloxanes, silica and crosslinkers/catalysts. Since the glass transition temperature is low ($T_g = -125 \, ^\circ C$), there is no need to add organic plasticizers, which could separate from the rubber. SILPURAN® silicone adhesives are dispensed and packaged in cleanrooms to prevent contamination by coarse particles.

Visual inspection and 50 μm filters ensure that SILPURAN® reaches our customers in an absolutely pure and clean state.

**Far More Than Just a Product**
SILPURAN® also means consistent top-notch service geared toward your success. Always at the ready, our teams of experts help you optimally adapt SILPURAN®’s virtually unlimited scope and innovative strength to your needs, thus creating customized product solutions which contribute to your long-term business success.
WACKER CLEAN OPERATIONS

Purity
- Dispensed and packaged under cleanroom conditions (the entire SILPURAN® product line meets Class 8 specifications as required in EN ISO 14644)
- RTV blended in a specially designated cleanroom with limited access, pest control measures and no dust-forming ingredients
- 50 μm filtration with individually sealed strainer filters
- Trained, qualified employees prevent contamination

Attention to Detail
- Select GMP criteria taken into account
- Batch-to-batch consistency
- Batch documentation and tracking
- Change control management
- Special attention to detail during maintenance, packaging and storage in order to ensure the highest product standards
- Visual inspection during the manufacturing process

Consistent Quality
- Integrated process control system
- Cleanroom classification qualified on an annual basis
- Annual FMEA; corrective action implemented
- Customers are informed in advance any time changes are to be made that impact product specifications
EXPERTISE AND SERVICE NETWORK
ON FIVE CONTINENTS

WACKER is one of the world’s leading and most research-intensive chemical companies, with total sales of €4.92 billion. Products range from silicones, binders and polymer additives for diverse industrial sectors to bioengineered pharmaceutical actives and hyperpure silicon for semiconductor and solar applications. As a technology leader focusing on sustainability, WACKER promotes products and ideas that offer a high value-added potential to ensure that current and future generations enjoy a better quality of life based on energy efficiency and protection of the climate and environment. Spanning the globe with 4 business divisions, we offer our customers highly-specialized products and comprehensive service via 23 production sites, 21 technical competence centers, 13 WACKER ACADEMY training centers and 50 sales offices in Europe, North and South America, and Asia – including a presence in China. With a workforce of some 13,800, we see ourselves as a reliable innovation partner that develops trailblazing solutions for,
EXPERTISE AND SERVICE NETWORK

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All figures are based on fiscal 2017.

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WACKER e-solutions are online services provided via our customer portal and as integrated process solutions. Our customers and business partners thus benefit from comprehensive information and reliable service to enable projects and orders to be handled fast, reliably and highly efficiently.

Visit us anywhere, anytime around the world at: www.wacker.com

All figures are based on fiscal 2017.
The data presented in this brochure are in accordance with the present state of our knowledge, but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this brochure should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies’ raw materials are also being used. The information provided by us does not absolve the user from the obligation of investigating the possibility of infringement of third parties’ rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the product for a particular purpose.