**Testing**

**Elongation** - The SF400 model of Silicoflex, rated at a 5” maximum opening, was bonded to a steel fixture and allowed to cure. It was then elongated to failure. The silicone seal withstood a 14” opening before it failed. When it did fail, it failed at the center of the silicone seal, and not at the bonding point.

**Vertical Load** - Silicoflex was bonded to a concrete surface and filled with debris. It was then frozen to -20 degrees (F). A vertical load was placed on the Silicoflex seal, simulating how vehicular traffic would impact the joint. Silicoflex withstood 2,200 lbs of force without failing. It could have withstood more, but this was the capacity of the hydraulic actuator.

**Cyclic Testing** - Silicoflex was installed in a cyclic test cell which displaces the joint seal at a 45º skew angle. 2,000 cycles were completed at -20º F without any rips, tears or bond failures.

**Accumulation of Debris** - Silicoflex was installed in a joint seal testing fixture, filled with debris, and then cycled to minimum and maximum opening. The arrangement of the joints allows debris to be channeled upwards, rather than staying trapped in the joint and overstressing the seal.

**Field Splice** - Two SF225 Silicoflex seals were spliced together using the locking adhesive. It was then stretched to failure. 750 lbs of force was recorded just prior to failure.

---

**Silicoflex Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Minimum Opening</th>
<th>Minimum Installation Width</th>
<th>Maximum Installation Width</th>
<th>Maximum Opening</th>
<th>Recess</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF 150</td>
<td>0.5 in min</td>
<td>0.5 in min</td>
<td>2.50 in</td>
<td>1.50 in</td>
<td>0.75 in</td>
</tr>
<tr>
<td>SF 225</td>
<td>0.5 in min</td>
<td>0.5 in min</td>
<td>2.75 in</td>
<td>1.25 in</td>
<td>0.75 in</td>
</tr>
<tr>
<td>SF 325</td>
<td>0.5 in min</td>
<td>0.5 in min</td>
<td>3.00 in</td>
<td>1.00 in</td>
<td>0.75 in</td>
</tr>
<tr>
<td>SF 400</td>
<td>0.5 in min</td>
<td>0.5 in min</td>
<td>3.50 in</td>
<td>1.25 in</td>
<td>0.50 in</td>
</tr>
<tr>
<td>SF 500</td>
<td>0.5 in min</td>
<td>0.5 in min</td>
<td>4.00 in</td>
<td>2.00 in</td>
<td>1.00 in</td>
</tr>
</tbody>
</table>

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**Silicoflex Joint Sealing System**

Popolopen Bridge, NY
**Silicoflex Joint Sealing System**

**Technology**

The Silicoflex joint sealing system was developed as a direct response to bridge owners asking for a higher quality, longer-lasting mechanical joint sealing system. The Silicoflex system consists of an extruded, preformed inorganic silicone gland with carbon black fillers to nearly eliminate the effects of UV radiation. The gland is shaped in an inverted "V" fashion which helps minimize the accumulation of debris that can also provide the system an extremely low-deflection, low-stress design. This makes the system less susceptible to the damaging effects of weather, vibration and movement.

**Features**

- **Low Stress Design**
- **Temperature Insensitive**
- **Radiation and Ozone Resistant**
- **Debris Friendly, Self Cleaning Design**
- **Durable**

**Installation Conditions**

The recommended minimum air/surface temperature to install Silicoflex is 40°F. The joint surface must be completely dry before installing Silicoflex. Silicoflex should not be installed when joint faces are soiled, congealed, or contaminated. Silicoflex requires a dry joint to ensure proper installation and adhesion.

**Installation Steps**

1. **Prepare joint surfaces**
   - Clean joint surfaces with a rag saturated in denatured alcohol. Roughening can be done by sandblasting, wire brushing or other mechanical methods approved by R.J. Watson. Joint surfaces must be free of contamination and debris.

2. **Apply a first bead of Silicoflex Locking Adhesive**
   - The "V" shaped design directs debris towards the edges of the joint opening. This prevents debris from becoming entrapped between the seal and joint header.

3. **Unroll Silicoflex seal, place adjacent to joint opening and clean the seal with a rag saturated in denatured alcohol.**

4. **Apply a second bead of Silicoflex Locking Adhesive along each side of the Silicoflex seal.**

5. **Allow 60 minutes before allowing traffic over a newly installed Silicoflex seal, unless directed otherwise by an approved representative.**

6. **Expansion, Contraction, & Movement**

- **Rubber expansion joints**
- **Metal expansion joints**
- **Contraction joints**
- **Flexible rubber joints**
- **Concrete contraction joints**
- **Concrete expansion joints**

**Material Properties**

<table>
<thead>
<tr>
<th>Property Value</th>
<th>Test Method</th>
<th>Typical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density (lb/ft³)</td>
<td>ASTM D4402</td>
<td>0.65 ± 0.06</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D412</td>
<td>200 psi (1.38 MPa)</td>
</tr>
<tr>
<td>Elongation</td>
<td>ASTM D412</td>
<td>400% min.</td>
</tr>
<tr>
<td>Toughness</td>
<td>ASTM D412</td>
<td>20 min max.</td>
</tr>
<tr>
<td>Compression Set</td>
<td>ASTM D514</td>
<td>60% max.</td>
</tr>
<tr>
<td>Resistance to UV</td>
<td>ASTM C679</td>
<td>No cracking or degradation</td>
</tr>
</tbody>
</table>

**Typical Silicoflex Applications**

- Silicoflex installed in stepped concrete headers
- Silicoflex installed in contact with vertical curbs, field spliceable and directional changes
- Silicoflex installed in stepped concrete headers
- Silicoflex installed in new concrete joint installations, which are bonded by the use of a single part adhesive and cured by the time the seal is placed in its final position.

**Material Properties**

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</tr>
<tr>
<td>Resistance to UV</td>
<td>ASTM C679</td>
<td>No cracking or degradation</td>
</tr>
</tbody>
</table>
The Silicoflex Joint Sealing system was developed as a direct response to bridge owners asking for a higher quality, longer lasting, maintenance-friendly joint sealing system. The Silicoflex system consists of an extruded preformed inorganic silicone gland with carbon black fillers to nearly eliminate the effects of UV radiation. The gland is shaped in an inverted ‘V’ fashion which helps minimize the accumulation of debris that also provides the system a means to evacuate this debris without leaking. These features make Silicoflex ideal for maintenance and reticulation projects.

Silicoflex will bond equally well to steel, concrete and elastomeric or polymeric concrete joint sealants. The system also comes with a single part silicone adhesive and a primer which creates a tremendously strong bond to the joint face. By selecting one of five individual Silicoflex glands, you may now seal any joint opening from ⅛” to 5”. The ability of the system to bond to new or existing steel, concrete, or elastomeric joint concrete makes this the most versatile system on the market today. The Silicoflex bridge joint system has garnered approvals from bridge owners all over the world for both new construction and rehab work based on its performance and incredible track record of longevity in the field. RJ Watson is proud to mention we have installations of this system that have been performing well for over 20 years now installed on major highways across the US.

**FEATURES**

- **Ultraviolet Radiation and Ozone Resistant**
- **Temperature Insensitive**
- **Versatile**
- **Debris Friendly, Self Cleaning Design**
- **Fast and Simple Installation**
- **Durable**
- **Maintenance Friendly**
- **Silicoflex installed to repair Strip Steel Locking Adhesive**
- **Silicoflex installed to repair Strip Seal Locking Mechanism Type A Extension**
- **Silicoflex installed with elastomeric or polymeric concrete expansion material**
- **Silicoflex installed in stopped concrete headers**
- **Silicoflex installed in stepped steel annuing**
- **Silicoflex installed to repair Strip Seal Locking Mechanism Type F Extension**
- **Silicoflex installed in瘦med concrete headers**

**TECHNOLOGY**

**INSTALLATION CONDITIONS**

The recommended minimum air/surface temperature to install Silicoflex is 40°F. The joint surface must be completely dry before installing Silicoflex. The system should be installed immediately after preparation of the joint face or if precipitation is forecast for the day. Comparative installation and installation of Silicoflex must be done during the same day. Traffic must not be allowed to pass over a sandblasted and ponded joint. RJ Watson recommends that all technical representatives who can provide hands-on training for installations of Silicoflex. It is highly recommended that the service be used by first-time installers. Please call our office to schedule a technical representative to be at your jobsite.

**INSTALLATION STEPS**

1. For new primed steel joint installations, brush blast the steel, then apply both vertical faces of the joint clean with a rag saturated in denatured alcohol. For new concrete joint installations, roughen concrete surface and wipe vertical faces of joint clean with a rag saturated in denatured alcohol. Roughening can be done by sandblasting, wire brushing or other mechanical methods approved by E.W. Watson. For joint replacements to existing joints, sandblast the vertical faces of the joint and wipe clean with a rag saturated in denatured alcohol.
2. Mix together a small component of Silicoflex Primer using slow stir. Pour into the vertical joint interfaces.
3. Uplift Silicoflex seal, place adjacent to joint opening and clean the seal with a rag saturated with denatured alcohol.
4. Using a 1/8” bead of Silicoflex, apply a ½” diameter bead of Silicoflex Locking Adhesive to both sides of the vertical faces of the joint. The bead of Locking Adhesive should be placed at least 1” below the top of the joint interfaces.
5. Insert the Silicoflex seal into the joint, starting 1” above the first bead of Silicoflex Locking Adhesive. Gently run the Silicoflex seal downward while maintaining contact of the sides of the seal to the joint header. Failure of the Silicoflex seal and to the proper depth, which is when the top of the seal is at least 1” below the top of the joint surface.
6. After a second bead of Locking Adhesive Locking Adhesive along each side of the Silicoflex seal, to the top of the vertical faces of the joint, and not higher. The second bead of Locking Adhesive Locking Adhesive should be in contact with the joint face and the seal.
7. The Silicoflex Locking Adhesive must be extended at least twice with a tongue depressor to ensure complete contact with the joint surface.
8. Allow 60 minutes before allowing traffic over a newly installed Silicoflex seal, unless dirtied otherwise by an approved representation. Vertical cuts, directional changes and field extents require the Locking Adhesive to be a bonding agent.

**TYPICAL SILICOFLEX APPLICATIONS**

**MATERIAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property Value</th>
<th>Test Method</th>
<th>Typical</th>
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<tbody>
<tr>
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<td></td>
<td></td>
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</tbody>
</table>

**SILICOFLEX GLAND**

<table>
<thead>
<tr>
<th>Property Value</th>
<th>Test Method</th>
<th>Typical</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**SILICOFLEX ADHESIVE**

<table>
<thead>
<tr>
<th>Property Value</th>
<th>Test Method</th>
<th>Typical</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
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</tbody>
</table>

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Front Cover Photo: Wando River Bridge, SC

RJ Watson Products, 103 Bluebird Drive, Murrells Inlet, SC 29576
Phone: 843-291-0500 | Fax: 843-291-1670 | Web Site: www.rjcommerce.com

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Joint Sealing System

Silicoflex is a joint sealing system specifically designed for bridge joint applications. It is a preformed inorganic silicone gland system that can be extruded into the joint opening and bonded with Silicoflex Locking Adhesive. The system is temperature insensitive, allowing it to accommodate large movement ranges while maintaining sealing performance. It is also resistant to weather, UV radiation, and ozone attack, making it highly resistant to the damaging effects of these elements.

**Features**

- **Temperature Insensitive:** Silicoflex can be installed in temperatures ranging from -60°F to 212°F.
- **Temperature Resistant:** The Silicoflex joint seal will not degrade under prolonged exposure to temperatures above 375°F.
- **Chemically Resistant:** It is resistant to most chemicals and solvents, including diesel fuel and fuel fillers.
- **Mechanically Stable:** Silicoflex is resistant to high-wear conditions, making it a suitable seal for bridge joint applications.
- **Longevity:** It can last for over 20 years in various weather conditions.
- **Versatility:** It can be used in both new construction and rehabilitation projects.

**Specification Chart**

<table>
<thead>
<tr>
<th>Property Value</th>
<th>Test Method</th>
<th>Typical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive Set</td>
<td>ASTM D195</td>
<td>2.0 lbs/sq in</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>ASTM D412</td>
<td>1,280 psi</td>
</tr>
<tr>
<td>Elongation</td>
<td>ASTM D412</td>
<td>30% max.</td>
</tr>
<tr>
<td>Tear Strength</td>
<td>ASTM D414</td>
<td>1,380 psi</td>
</tr>
<tr>
<td>Tack Time</td>
<td>ASTM D2240</td>
<td>20 min max.</td>
</tr>
<tr>
<td>Care Time</td>
<td>ASTM D2240</td>
<td>24 hrs max.</td>
</tr>
<tr>
<td>Resistance to UV</td>
<td>ASTM C793</td>
<td>No cracking or degradation</td>
</tr>
</tbody>
</table>

**INSTALLATION CONDITIONS**

The recommended minimum air surface temperature to install Silicoflex is 40°F. The joint surface must be completely dry before installing Silicoflex. Silicoflex should not be installed immediately after precipitation or if precipitation is forecast for the day. Joint preparation and installation of Silicoflex must be done during the same day. Traffic must not be allowed to pass over a newly sandblasted and primed joint. R.J. Watson emphasizes that the best professionals who can provide hands-on training for installers of Silicoflex. It is highly recommended that this service be used by first-time installers.

**INSTALLATION STEPS**

1. **Step 1:** Clean the joint opening with a sandblaster. R.J. Watson employs qualified technical representatives who can provide hands-on training for installers of Silicoflex. It is highly recommended that this service be used by first-time installers. Please call our office to schedule a technical representative to be at your jobsite.

2. **Step 2:** Allow 60 minutes before allowing traffic over a newly installed Silicoflex seal, unless directed otherwise by an approved representative. Vertical curbs, directional changes and field splices otherwise by an approved representative. Field splices must be placed at least 1” below the top of the joint elevation. For new primed steel joint installations, brush blast the seal with a 1/2” diameter bead of Silicoflex Locking Adhesive along each side of the joint envelope. This bead of Silicoflex Locking Adhesive should be placed at least 0.5” below the top of the joint envelope.

3. **Step 3:** The Silicoflex Locking Adhesive must be ‘tooled’ at least twice with a tongue depressor to ensure complete contact with the joint face.

4. **Step 4:** Apply a second bead of Silicoflex Locking Adhesive along each side of the Silicoflex seal, to the top of the vertical faces of the joint. The bead of Silicoflex Locking Adhesive should be placed at least 0.5” below the top of the joint envelope.

5. **Step 5:** The Silicoflex Locking Adhesive must be ‘tooled’ at least twice with a tongue depressor to ensure complete contact with the joint face. For joint replacements to existing joints, sandblast the joint clean with a rag saturated in denatured alcohol. For new concrete joint installations, brush blast the joint clean with a rag saturated in denatured alcohol. Roughening can be done by sandblasting, wire brushing or other mechanical methods approved by R.J. Watson. Joint replacements to existing joints, sandblast the joint clean with a rag saturated in denatured alcohol.

6. **Step 6:** Mix together all components of Silicoflex Primer using a hand or drill mixer. Apply to the joint surfaces.

7. **Step 7:** Allow 30-60 minutes after the installation is complete, the lane can be reopened to traffic.

8. **Step 8:** Silicoflex seal is at least 0.5” below top of road surface. For new primed steel joint installations, brush blast the seal with a 1/2” diameter bead of Silicoflex Locking Adhesive along each side of the joint envelope. This bead of Silicoflex Locking Adhesive should be placed at least 0.5” below the top of the joint envelope.

9. **Step 9:** Apply a second bead of Silicoflex Locking Adhesive along each side of the joint envelope. This bead of Silicoflex Locking Adhesive should be placed at least 0.5” below the top of the joint envelope.

10. **Step 10:** The Silicoflex Locking Adhesive must be ‘tooled’ at least twice with a tongue depressor to ensure complete contact with the joint face. For joint replacements to existing joints, sandblast the joint clean with a rag saturated in denatured alcohol.

11. **Step 11:** Allow 60 minutes after installing Silicoflex. Tack time is about 15-20 minutes per lane. 24-48 hours after the installation is complete, the lane can be reopened to traffic.

12. **Step 12:** Silicoflex installed in stepped steel armoring.
Elongation - The SF400 model of Silicoflex, rated at a 5” maximum opening, was bonded to a steel fixture and allowed to cure. It was then elongated to failure. The silicone seal withstood a 14” opening before it failed. When it did fail, it failed at the center of the silicone seal, and not at the bonding point.

Vertical Load - Silicoflex was bonded to a concrete surface and filled with debris. It was then frozen to -20 degrees (F). A vertical load was placed on the Silicoflex seal, simulating how vehicular traffic would impact the joint. Silicoflex withstood 2,200 lbs of force without failing. It could have withstood more, but this was the capacity of the hydraulic actuator.

Cyclic Testing - Silicoflex was installed in a cyclic test cell which displaces the joint seal at a 45º skew angle. 2,000 cycles were completed at -20º F without any rips, tears or bond failures.

Accumulation of Debris - Silicoflex was installed in a joint seal testing fixture, filled with debris, and then cycled to minimum and maximum opening. The inverted 'V' shape directs debris to the seal where it is bonded and fixed. This consequently causes debris to be channelled upwards, rather than staying trapped in the joint and overstressing the seal.

Field Splice - Two SF225 Silicoflex seals were spliced together using the locking adhesive. It was then stretched to failure. 750 lbs of force was recorded just prior to failure.
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