Expansion Joint Systems

V-Seal System

Product Description
V-Seal is a preformed extruded EPDM seal that can be bonded to concrete, steel or elastomeric concrete with a quick-setting V-Epoxy-R adhesive.

Basic Uses
Typical applications include: control joint and expansion joints for both new and rehabilitation projects for bridges, highways, parking structures, stadiums, plazas, water and sewage treatment facilities and other types of concrete construction.

Advantages
• EPDM seal is weather, UV, ozone and tear resistant
• Designed for use under extended water immersion
• Flexible at lower temperatures
• V-Epoxy-R adhesive bonds in excess of 1500 PSI
• V-Epoxy-R is available in 600 ML dual cartridges
• Easy rehabilitation of existing expansion joints
• Quick installation
• Movements up to 5"
• Full cure of the V-Epoxy-R adhesive at 70°F is 24 hours

Property Test Method Requirement

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>ASTM D412</td>
<td>1200 PSI Min</td>
</tr>
<tr>
<td>Elongation</td>
<td>ASTM D412</td>
<td>400% Min</td>
</tr>
<tr>
<td>Durometer Content</td>
<td>ASTM D2240</td>
<td>50±5</td>
</tr>
<tr>
<td>Ozone Resistance</td>
<td>ASTM D1171</td>
<td>100 Min</td>
</tr>
<tr>
<td>Water Resistance - 70 Hrs at 100°C</td>
<td>ASTM D471</td>
<td>10% Max</td>
</tr>
<tr>
<td>Tear Strength</td>
<td>ASTM D624 (Die C)</td>
<td>150 PLI</td>
</tr>
</tbody>
</table>

V-Seal Chart

<table>
<thead>
<tr>
<th>Property</th>
<th>Min. Opening Width</th>
<th>Min. Opening Height</th>
<th>Min. Install Wd. Width</th>
<th>Min. Install Wd. Height</th>
<th>Max. Install Wd. Width</th>
<th>Max. Install Wd. Height</th>
<th>Max Opening Width</th>
<th>Max Opening Height</th>
<th>Min Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-300</td>
<td>0.625&quot;</td>
<td>2.250&quot;</td>
<td>1.750&quot;</td>
<td>2.125&quot;</td>
<td>3.500&quot;</td>
<td>1.750&quot;</td>
<td>3.625&quot;</td>
<td>1.500&quot;</td>
<td>2.500&quot;</td>
</tr>
<tr>
<td>V-400</td>
<td>1.000&quot;</td>
<td>2.750&quot;</td>
<td>2.250&quot;</td>
<td>2.500&quot;</td>
<td>4.500&quot;</td>
<td>2.000&quot;</td>
<td>5.000&quot;</td>
<td>1.375&quot;</td>
<td>3.500&quot;</td>
</tr>
<tr>
<td>V-500</td>
<td>1.000&quot;</td>
<td>3.375&quot;</td>
<td>3.000&quot;</td>
<td>3.125&quot;</td>
<td>5.000&quot;</td>
<td>2.750&quot;</td>
<td>6.000&quot;</td>
<td>1.625&quot;</td>
<td>4.000&quot;</td>
</tr>
</tbody>
</table>

Complete installation instructions are available on dsbrown.com/bridges/expansion-joint-systems/v-seal.
V-Epoxy-R Adhesive Properties

The V-Epoxy-R adhesive meets the requirements of ASTM C881 Type III, Grade 2. The adhesive shall also have the following properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray Color</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity</td>
<td>45,000 cP (typical)</td>
<td></td>
</tr>
<tr>
<td>Gel Time</td>
<td>ASTM C881</td>
<td>30 Minutes Min</td>
</tr>
<tr>
<td>Shelf Life (in separate sealed containers)</td>
<td>12 Months</td>
<td></td>
</tr>
</tbody>
</table>

Responsibility

- It is the responsibility of installer to understand all of the requirements of this document before attempting to install the V-Seal system.
  - Failure to perform any of the steps outlined in this document will result in under performance or failure of the V-Seal product.
  - Failure to perform any of the steps outlined in this document shall void any warranties, either expressed or implied, with regard to the V-Seal system.

- It is the responsibility of The D.S. Brown Company to provide written instructions with regard to the proper installation and handling of the V-Seal system.

- It is the responsibility of The D.S. Brown Company to provide technical support, training, and quality control testing as requested by the installer, contractor, or owner of the project.
  - Technical support, training, and quality control testing is available for a fee.

Product Description

- The seal component is an elastomeric diaphragm supplied in a continuous length. It is available for movements up to 5 inches.

- The conditioning agent is a solvent based conditioner that activates the surface of the seal to create a bond with the V-Epoxy-R. It is supplied in 1-quart bottles.

- The V-Epoxy-R is supplied in 600mL dual cartridges. One cartridge of V-Epoxy-R is capable of bonding 6 joint feet of seal for V-300 and V-400, and 5LF for V-500.

  - Mixing tip for dual cartridges is included with the shipment.

- Closed cell polyethylene backer rod is available from D.S. Brown for setting the proper joint depth for the V-SEAL system.
  - The closed cell backer rod diameter should be slightly larger than joint opening and capable of supporting the V-Seal gland until the epoxy material cures.

Product Safety

- The V-Epoxy-R is corrosive. Please review each component’s SDS before installation to fully understand the safety concerns related to this system. Failure to do so could result in serious injury or death.

  - The following guidelines are recommendations consistent with the SDS literature. These recommendations are not intended to supersede or replace any existing requirements set forth by local laws or policies.
    - Use in a well-ventilated area, using good industrial hygiene practices. Avoid contact with eyes, skin, and clothing and wear proper PPE.

Personal Protective Equipment (PPE)

- Use approved respiratory protection equipment when airborne exposure is above the occupational exposure limits.
  - Consult SDS for exposure limits.
  - Operators shall be properly trained in the use of a respirator.

  - Corrosive-resistant chemical gloves (e.g., nitrile)
  - Eye protection consisting of safety glasses with side shields or tightly sealed goggles
  - Skin protection consisting of impervious clothing, including but not limited to the use of an apron; use long sleeves at a minimum.
  - Workers not wearing the correct PPE should not enter the application area.
  - In the event of an over-exposure to the product, see section 4 of the SDS for First Aid Measures.
Material Storage
- The V-Epoxy-R and conditioner should be stored in a dry environment within a temperature range of 60°F to 80°F. Extremes of temperature beyond this range may result in crystallization or polymerization of the materials and render them unsuitable for use.
- It is recommended that the V-Epoxy-R be used within one year of manufacture. Beyond one year, the material should be checked to ensure suitability for the application.

Equipment
- Equipment requirements for the installation of the V-Seal system are as follows:
  - Wire brush
  - Sandblaster
  - Dual cartridge applicator gun, 600mL
  - Clean rags and paint brush
  - Acetone or denatured alcohol for removal of conditioner
  - Duct tape or other suitable masking material
  - Caulking spatula

Pre-Application Inspection
- Visual Inspection of the expansion joint is the first task to be completed by the installer.
- New concrete shall have a minimum of 14 days of cure.
  - Moisture content of the concrete shall be below 5%.
- All formwork must be removed.
- Substrate temperature and air temperature must be above 40°F and rising
  - The V-Seal system can be installed at temperatures below 40° but longer cure times for the epoxy bonding agent will be required.
- In applications where the V-Seal system will be replacing an existing seal system the old system must be completely removed before installation of the V-Seal system.
- Joint components, such as armor angle or strip seal channels may remain in place, but must be inspected to ensure that they are soundly secured in concrete.
- Steel profiles should be grit blasted to an SSP6 finish or better in the bonding area.
- Loose, contaminated, weak, spalled, deteriorated and/or delaminated concrete must be removed to sound concrete.
  - Any spalls, voids, or structural cracking at joint interfaces must be repaired.
  - Concrete should be grit blasted to a finish between coarse sandpaper and a ¼” profile.
- Joint openings must be free of all contaminants, loose materials, dry and free of frost.
  - V-Epoxy-R will not bond to water.

Installation
- Before starting installation take time to ensure that all materials are available and ready for use, including an adequate amount of personnel to complete the installation.
- Mask off joint edges to facilitate easier cleanup.
- Install closed cell backer rod to a depth that will allow the seal to install deep enough in the joint opening so that at full closure the seal is at least ¼” (¼” preferred) below the deck surface.
- With a clean rag or paint brush, apply conditioner to both sides of the seal in the bonding area (Fig. 1).
- Roughen the bonding area with a wire brush to work the conditioner into the seal.
- After 5 minutes remove the conditioner using a clean rag and denatured alcohol or acetone.
- Apply a 3/8” bead of V-Epoxy-R on both sides of the closed cell backer rod against the joint wall (Fig. 2).
- Install the V-Seal by pressing the lug portion of the seal into the bead of V-Epoxy-R on both sides of the joint.
• Apply a final bead of V-Epoxy-R along the top of the lugs.
  - The V-Epoxy-R should be filled to the top adhesive groove.
• **Excess V-Epoxy-R should be removed before cure. No V-Epoxy-R should be present on the smooth top surface of the seal.**

**Clean Up**

• Clean all uncured V-Epoxy-R off of the top portion of the seal.
• Uncured V-Epoxy-R is removed as you would spilled resin. Scrape as much material as you can from the surface using a stiff metal or plastic scraper. Clean the residue with lacquer thinner, acetone, or alcohol placed on a clean rag.
  - Follow safety warnings on solvents, and provide adequate ventilation.
• Remove all masking materials.
• Unused V-Epoxy-R and conditioner should be disposed of according to local rules and regulations.
  - Consult SDS for proper disposal methods.

Closed Cell Backer rod is not needed when installing V-Seal in an armored angle joint that has shelf tabs placed at the proper depth on each side of the joint.