

BUILDING SCIENCE

DOWSIL™ Brand Parking Structure Sealants

Installation guide

DOW

®



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Preface

Parking structure joints call for a tough sealant that can withstand excessive horizontal and vertical movement, has good weatherability and is easy to install with a short downtime and long service life.

DOWSIL™ brand Parking Structure Sealants can do the job. DOWSIL™ Parking Structure Sealants can be installed in new or old joints in concrete and patching compounds over a wide temperature range. The sealants cure upon exposure to moisture in the air to form a permanently flexible, low- to ultra-low-modulus, highelongation silicone rubber seal.

DOWSIL™ Parking Structure Sealants are capable of withstanding extension of 100 percent and compression of 50 percent of the original joint width. They have excellent recovery, which makes them ideal for use in joints that experience a high degree of movement.

To fully utilize these capabilities, the sealant must be properly installed in properly designed joints. This guide gives correct installation procedures, which begin with good joint design and preparation. The guide also covers backer rod installation and provides a list of installation equipment and manufacturers of recommended equipment.

DOWSIL™ Parking Structure Sealants

What They Are

The three DOWSIL™ Parking Structure Sealants are members of the same family and are based upon similar technologies.

DOWSIL™ FC Parking Structure Sealant is a two-part, self-leveling, fast-cure silicone sealant that readily extrudes over a wide temperature range. It features a fast cure rate, enabling its use where timing is critical. It cures to form a durable, flexible, ultra-low-modulus, high-elongation silicone rubber joint seal for use on concrete and/or asphalt. Primer is required on all applications, except asphalt. During application, the material consistency remains relatively unchanged (as compared with nonsilicone-based materials) from -35 to 140°F (-32 to 60°C). It retains its gunnability and can be pumped at low temperatures.

DOWSIL™ SL Parking Structure Sealant is a one-part, **self-leveling** sealant that readily extrudes over a wide temperature range. It cures on exposure to atmospheric moisture to form a durable, flexible, ultra-low-modulus, highelongation silicone rubber joint seal for use on concrete and/or asphalt. Primer is not required on most applications. During application, no mixing of the sealant is required, and the material consistency remains relatively unchanged (as compared with nonsilicone-based materials) from -35 to 140°F (-32 to 60°C). It retains its gunnability and can be pumped at low temperatures.

DOWSIL™ NS Parking Structure Sealant is a one-part, **non-sag** silicone formulation that can be installed over a wide temperature range. It requires tooling and cures on exposure to atmospheric moisture to form a durable, flexible, low-modulus, high-elongation, silicone rubber joint seal for use on concrete. Primer is not required on most applications. During application, no mixing of the sealant is required, and the material consistency remains relatively unchanged (as

compared with nonsilicone-based materials) from -35 to 140°F (-32 to 60°C). It retains its gunnability and can be pumped at low temperatures.

Where To Use Them

DOWSIL™ FC Parking Structure Sealant is ideal for use in concrete, asphalt and/or metal-armored joints that experience a high degree of movement, such as expansion joints in parking structures. Its fast cure time minimizes downtime; the sealant accommodates typical thermal and differential joint movements without damage – even within a short time after application. Its self-leveling characteristic makes it an excellent choice for horizontal joints and for joints on moderate slopes (6 percent or less). It can also be used in remedial work where other materials have failed because of excessive movement or poor weatherability. It is part of the PDX Expansion Joint System¹, which combines a high-strength flexible polymer nosing with this fast-cure silicone and is specifically designed for restoration of failed expansion joint systems.

DOWSIL™ SL Parking Structure Sealant is ideal for use in concrete and/or asphalt² joints that experience movement, such as construction and control joints in parking structures. It is also ideal for use in sealing asphalt/asphalt joints in new asphalt overlays or joints prepared over reflection cracks in old asphalt overlays. Its self-leveling characteristic makes it an excellent choice for horizontal joints and for joints on moderate slopes (6 percent or less). It is also used in remedial work where other materials have failed because of excessive movement or poor weatherability.

DOWSIL™ NS Parking Structure Sealant is ideal for use in concrete joints that experience movement, such as control joints in parking structures. It withstands extension of 100 percent and compression of 50 percent of original joint width and has excellent recovery. Its non-sag characteristic makes it an excellent choice for vertical joints, parapets, deck perimeter joints, steep slopes and as an end dam for the self-leveling sealant. It is often used in remedial work, especially where other materials have failed because of excessive movement or poor weatherability.

DOWSIL™ Parking Structure Sealants are not recommended for use in totally confined joints where the sealant is not exposed to atmospheric moisture during cure. Additionally, these sealants are not recommended for use in applications involving water immersion.

DOWSIL™ NS Parking Structure Sealant should be tooled with a recess below the concrete surface to minimize abrasion from traffic and snow removal equipment. Wet tooling is not recommended.

DOWSIL™ SL Parking Structure Sealant and DOWSIL™ FC Parking Structure Sealant require no tooling. Experience has shown that silicone joint sealant performance can be improved by maintaining a recess of 1/4 to 1/2 inch or greater.

¹The PDX Expansion Joint System, U.S. Patent 5,190,395, is marketed by Silicone Specialties, Inc.

²Asphalt must be sound and in good condition.

Other Applications

Contact your Dow representative for more information on other applications such as loop seals and fire-rated joints.

Important Considerations

Joint faces must be clean, dry and frost-free when the sealant is installed. Joints must be free of standing water.

Joint cleanliness – A clean joint shall have no visible signs of residual sealant or debris on the joint face and will leave no residual cement powder or dust on your fingers after rubbing the joint face.

Dew point – Do not install sealant when the temperature is at or below the dew point, which is the temperature at which the air is saturated with moisture vapor and liquid water (dew) begins to form on the joint face.

Inclement weather – If rain or other inclement weather occurs during joint preparation or sealing, all operations should cease and sufficient time must be allowed so that the joints are dry (visibly and to the touch) prior to starting/ continuing the sealing operation.

Note: Drying joints with direct flame is inappropriate due to the creation of moisture vapor and carbon deposits.

In no case should sealant be installed in a joint that has standing water.

How To Use DOWSIL™ Parking Structure Sealants

Cure Characteristics

DOWSIL™ Parking Structure Sealants cure by reacting with atmospheric moisture, and the cure rate is dependent on temperature and humidity. At a temperature of 75°F (24°C) and relative humidity of 50 percent, DOWSIL™ NS Parking Structure Sealant will cure to a tack-free surface in one hour or less and reach its ultimate properties in 7 to 14 days. Temperatures of 100°F (38°C) will reduce the tack-free time to about 30 minutes, and ultimate properties of the sealant could be reached in just a few days of continuous exposure. Conversely, low temperatures will reduce the cure rate and increase the time required for the sealant to become tack-free. For example, at 40°F (4°C), the tack-free time will be about 2 to 3 hours. At a temperature of 75°F (24°C) and a relative humidity of 50 percent, DOWSIL™ SL Parking Structure Sealant will skin over in about 40 minutes. The self-leveling joint sealant will reach its ultimate properties in 14 to 21 days. In comparison, fast-cure DOWSIL™ FC Parking Structure Sealant will skin over in under 20 minutes, and reach 90 percent ultimate properties in just 6 hours. DOWSIL™ Parking Structure Sealants will cure slightly faster at higher temperatures and slower at lower temperatures.

When using fast-cure, two-part DOWSIL™ FC Parking Structure Sealant in new or existing concrete, the parking structure may be opened to traffic as soon as a skin forms on the sealant. In comparison, one-part sealants may require days to reach ultimate properties.

Once cured, DOWSIL™ Parking Structure Sealants have the capability to withstand a high degree of extension and compression with no loss of bond.

Joint Design

Good sealant installation begins with good joint design, and anticipated movement is a key design consideration. Proper design and correct installation procedures will maximize performance. See Tables I and II on page 5-6 and Figures 1-4 on page 6-7.

Joint Width for Installation

Joints may be either sawed or formed to the required dimensions. The minimum joint width recommended for DOWSIL™ Parking Structure Sealants is 1/4 inch; a 3/8-inch width is generally preferred for faster sealant installation.

The maximum joint width recommended for high-performance DOWSIL™ FC Parking Structure Sealant is 3 inches.

The joints should be sized so maximum extension and compression does not exceed +100 and -50 percent respectively.

Joint Depth

The joint must be deep enough to allow proper placement of the sealant and a bond breaker/backer rod. Minimum depth requirements will vary slightly depending on joint width (see joint design illustrations on pages 6-7).

Experience has shown that better performance of DOWSIL™ Parking Structure Sealants can be obtained by maintaining a recess of 1/8 to 1/2 inch. It is especially important to maintain the proper recess as the joint width approaches and/or exceeds 1 inch. Dow recommends the following recess guidelines:

Joint Width, inch	Recess, inch
1/4 to 1	1/8 - 1/4
1-2	1/4 - 3/8
2-3	1/4 - 1/2

Joint Preparation

Obtaining the desired performance depends upon using correct installation procedures. All contaminants, especially dried laitance from sawcutting and previous sealants, must be removed. Leaving materials of this type on the surface of the joint face will prevent development of a good adhesive bond. A clean joint will have no visible signs of residual sealant or debris on the joint wall, and will leave no residual cement powder or dust on your fingers after rubbing the joint face.

DOWSIL™ NS Parking Structure Sealant will not bond to wet concrete. Likewise, DOWSIL™ SL Parking Structure Sealant and DOWSIL™ FC Parking Structure Sealant will not bond to wet concrete or asphalt. Moisture in and on the pavement is difficult to detect. The pavement **MUST** be dry. When in doubt, it is wiser to allow additional drying time than to risk sealant adhesion failure.

Joint faces must be clean, dry and frost-free when the sealant is installed.

After drying, it is especially important that the joint face be sandblasted. When sandblasting, follow all federal, state and local laws and/or regulations regarding the proper use and handling of equipment. The primary purpose is to remove traces of residual laitance or sealants. The sandblasting nozzle must be held at an angle to the joint face and within 1 or 2 inches of the concrete. Pointing it toward the bottom of the joint or at too great a distance from the face allows the force of the blast to dissipate ineffectively. These points and others regarding surface preparation of new and existing concrete are expanded upon in following selections.

Backer Rod Selection

Another essential element in good joint design is use of a bond breaker/backer rod. A primary function of the backer rod is to act as a bond breaker, preventing three-sided adhesion of the sealant while at the same time forming the desired cross section of the sealant bead. Failure to utilize a backer rod will allow the sealant to bond to the bottom of the joint. This results in excessive stress on the sealant and reduced performance.

Another function of the backer rod is to control the thickness of the sealant bead. The backer rod should be approximately 25 percent oversized so that it fits tightly into the joint. A loose backer rod will be pushed deeper into the joint when the sealant is installed and will not provide adequate support for proper tooling of DOWSIL™ NS Parking Structure Sealant. Thus, the thickness of the sealant bead cannot be controlled as required. With proper tooling, DOWSIL™ NS Parking Structure Sealant is pushed down onto the backer rod and firmly against the joint walls, resulting in intimate contact, proper wetting and good adhesion with the joint walls.

DOWSIL™ SL Parking Structure Sealant and DOWSIL™ FC Parking Structure Sealant require a tight-fitting backer rod to control thickness of the sealant bead and to prevent the sealant from bypassing the backer rod to the bottom of the joint.

Failure to use a backer rod, or use of the wrong material, will result in failure or reduced performance of the sealant. Dow recommends the use of a closed-cell, expanded polyethylene foam rod for general use with DOWSIL™ Parking Structure Sealants. Where the joints are irregular, bond breakers such as soft-type rod (not open-cell polyurethane) help prevent the self-leveling sealants from bypassing the backer rod. Polyethylene bond breaker tapes are typically used in shallow joints that do not allow for backer rod placement. In all cases, the backer rod must be oversized so that it fits tightly in the joint.

Sealant and Backer Rod Placement Depths

Traffic Areas

The sealant bead must be placed a minimum of 1/8 inch below the concrete surface. The sealant bead should be a minimum of 1/8-inch thick but should not be greater than 1/2-inch thick. A width-to-depth ratio of 2:1 is ideal and should be maintained throughout the bead whenever possible.

Non-Traffic Areas

In non-traffic areas, such as deck perimeter joints, cove joints, vertical joints and expansion joints at stair towers, the sealant can be applied flush to the top of the concrete. Considerations should be made for damage by snow-removal equipment.

In cases where the potential of heel penetration may exist in pedestrian traffic areas, a stiffer or higher density backer material should be considered beneath the sealants. Wide expansion joints can utilize a metal cover plate if so desired. Contact your Dow representative for more information.

Table I. Expansion Joint Sizes

Movement ¹ , inches	-1/4 to +1/2	-3/8 to +3/4	-1/2 to +1	-3/4 to +1-1/2	-1 to +2	-1-1/2 to +3
Minimum Joint Size Required, inches	1/2	3/4	1	1-1/2	2	3

¹Good design practice calls for sizing these joints to be twice the total anticipated movement, after accounting for all tolerances.

Table II. Use Chart/Selection Guide

	DOWSIL™ NS Parking Structure Sealant	DOWSIL™ SL Parking Structure Sealant	DOWSIL™ FC Parking Structure Sealant	DOWSIL™ FC Parking Structure Sealant w/ Silspec 950
Control Joints	R, N	R, N	R, N	-
Construction Joints	R, N	R, N	R, N	-
Deck Perimeter Joints	R, N	R, N	R, N	-
Cove Joints	R, N	-	-	-
Parapets	R, N	-	-	-
Curbs	R, N	-	R, N ¹	-
Metal Armor Joints²	R, N	R, N	R, N	(See page 11)
Asphalt	-	R, N	R, N	-
Sidewalks	R, N	R, N	R, N	-
Concrete Pavers	R, N	R, N	R, N	-
Stone Pavers	R, N	-	-	-
High Movement Expansion Joints	-	-	R, N	R, N

Key: R = Remedial Application; N = New Application; “-” = not appropriate.

¹ Precast, premolded sealant can be cut to seal curbs at expansion joint transitions.

² Follow primer recommendations; one-part sealants will not work with a zinc-rich primer.

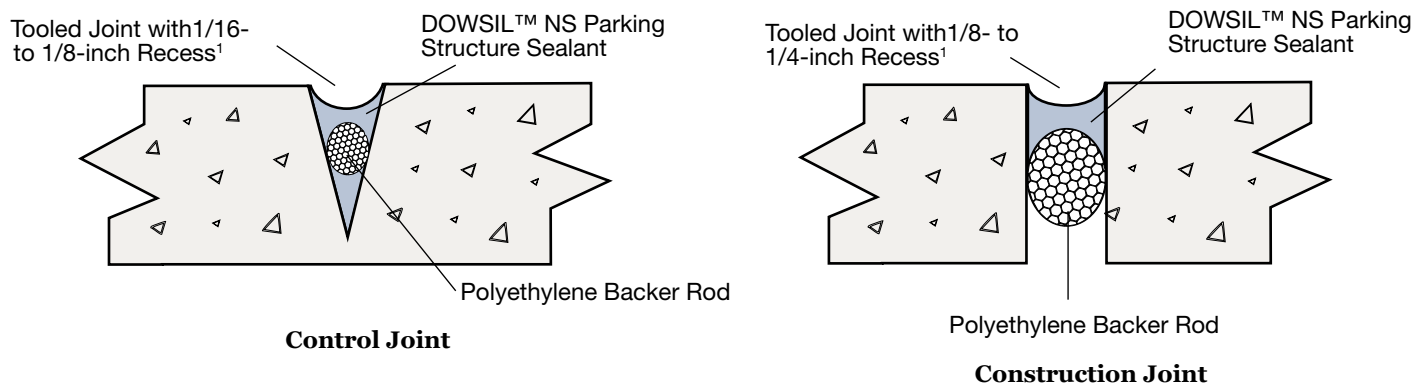
Table III: Usage Rates and Recess Recommendations

Joint Width, inches	Recommended Sealant Bead Thickness, inches ¹	Recess, inches	FC Kit Yield, linear feet ²	FC/SL Gallon Yield, linear feet	NS Gallon Yield, linear feet
1/2	1/4	1/4	35	123	103
1	1/2	1/4	9	35	26
1-1/2	1/2	3/8	6	26	19.5
2	1/2	1/2	4.5	17	13
2-1/2	1/2	1/2	3.8	12.7	9.7
3	1/2	1/2	2.3	8.5	6.5

¹ Bead thickness measured from high point of backer rod in the joint.

² Yield varies with joint design, backer placement, waste and experience. Above yield is based on one kit containing two 20-fl oz E-Z Pak sausages of DOWSIL™ FC Parking Structure Sealant.

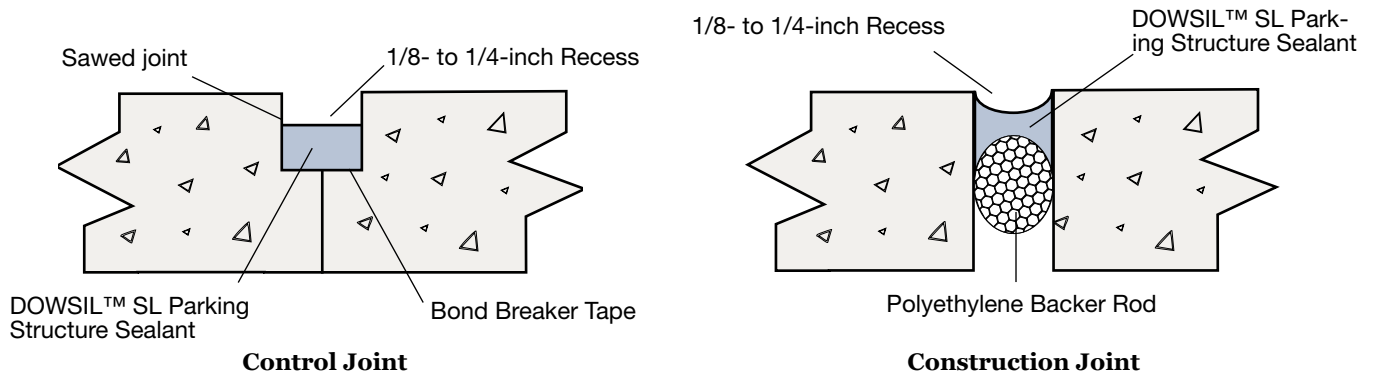
Figure 1. Good Joint Design – DOWSIL™ NS Parking Structure Sealant



1. Joint width wide enough to accommodate movement.
2. Joint deep enough to allow for recess, sealant placement and backer rod.
3. Proper backer rod placement.
4. Sealant installed to proper depth and width.
5. Sealant recessed 1/16 to 1/4 inch below pavement surface, depending on design (see above details).

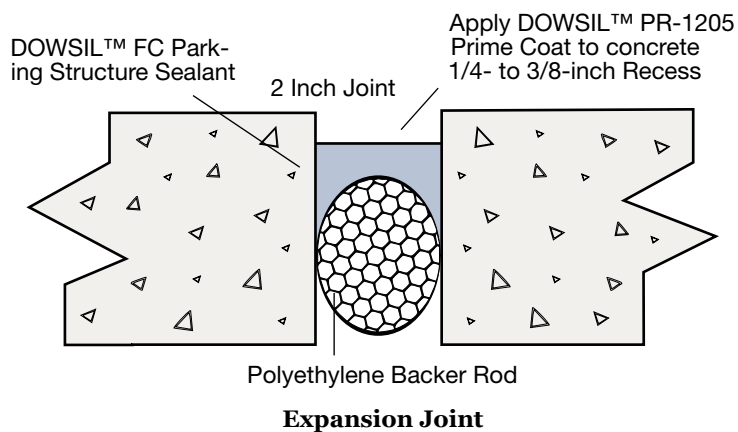
¹ In vertical applications, it is appropriate to have sealant flush to the surface.

Figure 2. Good Joint Design – DOWSIL™ SL Parking Structure Sealant



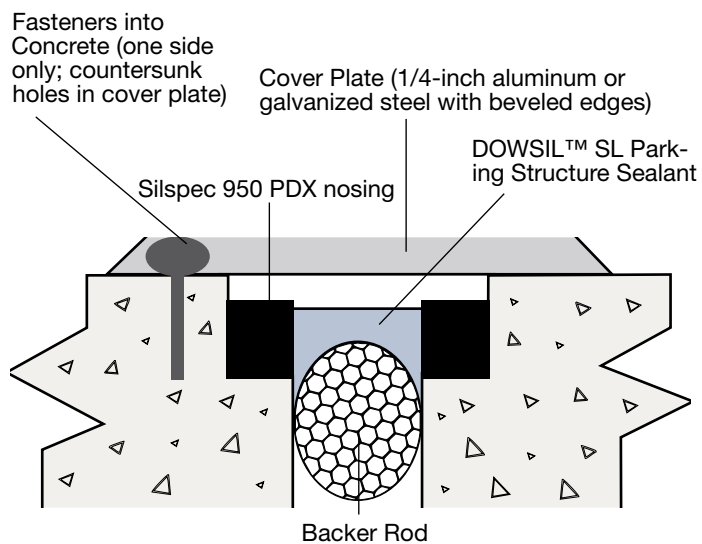
1. Joint width wide enough to accommodate movement.
2. Joint deep enough to allow for recess, sealant placement and backer rod/bond breaker tape.
3. Proper backer rod/bond breaker tape placement.
4. Sealant installed to proper depth and width.
5. Sealant recessed 1/8 to 1/4 inch below pavement surface.

Figure 3. Good Joint Design – DOWSIL™ FC Parking Structure Sealant



1. Joint width wide enough to accommodate movement.
2. Joint deep enough to allow for recess, sealer placement and backer rod.
3. Proper backer rod placement.
4. Sealant installed to proper depth and width.
5. Sealant recessed 1/4 to 3 /8 inch below pavement surface.

Figure 4. Typical Joint Design – Cover Plate



1. Non-slip strips should be attached to the top of the cover plate.
 2. Cover plate width should be 3 times the width of the joint.
- NOTE:** This is a typical design. An actual design should be determined by the designer.

Sealing New Concrete

Before attempting to seal sawed joints in new concrete, the concrete must be given plenty of time to cure, dry and develop strength such that the joint reservoir can be sawn without concrete damage (i.e., raveling, spalling, etc.). The time between sawing of the initial cut (contraction cut to control cracking) and the joint sealant reservoir will depend upon such factors as mix design, cement type, time of year concrete is placed, temperature, etc. Only clean and dry joints should be sealed.

For conventional concrete mixes, the concrete should be allowed to cure and dry a minimum of 7 days in good drying weather before installing DOWSIL™ Parking Structure Sealants. Cold, wet, inclement weather will require a longer drying time. An additional day of good drying weather should be allowed for each day of poor drying weather.

Joint sealant reservoirs are prepared by sawcutting the concrete (using diamond blades) to the specified width and depth. It is recommended that freshly sawed joints be washed with high-pressure water immediately after sawing to remove most of the saw slurry from the joint faces. Joint washing should be in one direction (working forward) to minimize recontamination.

Control joints are often formed over double-tees upon placement of the topping slab. After the topping slab has cured 7 days, the joints should be sandblasted to remove residual laitance from the joint walls.

Sandblasting should be done in two passes, one for each face, with the nozzle held at an angle to the joint face and within 1 or 2 inches of the concrete. Sandblasting should be done to the depth at which the sealant and backer rod are to be installed. Experience has shown that the best method for removing contaminants is by sandblasting the dry joint that has been previously flushed with water after the saw-cutting process. Other techniques, such as grinding or wire brushing, have been found to be less effective due to possible operator error and/or equipment problems. If conditions are such that sandblasting is not permitted, high-pressure waterblasting may be used as an alternative. Before attempting to use these joint cleaning methods, contact your Dow representative to discuss the appropriate procedures.

After sandblasting, the sand, as well as any dust and dirt deposited by wind and traffic, must be blown out of the joint and away from the area around it using high-pressure air blast. As with the water wash, the air blast should move in only one direction (forward) to prevent recontamination of the joint. Compressed air, at a pressure of at least 90 psi, should be used to blow out the joint just before installation of the backer rod. Air compressors used for this purpose **must** be equipped with traps capable of providing moisture-free and oil-free air.

Primers must be installed and allowed to dry before backer rod installation. (See page 10 for more information on primer installation.)

Just before the backer rod is installed into the joint, wipe a clean cloth across the dry joint face to determine that residual dust or dirt has been removed. If joints still contain dust or dirt,

these contaminants must be removed before backer rod and sealant installation.

Solvents should not be used to remove oils, because they generally only carry the materials further into the concrete pores or spread them over the surface.

Resealing Existing Concrete

The installation techniques required for resealing can be summarized as removal of old sealant/seal, proper cleaning of the joint, and installation of the bond breaker and sealant.

The tools and techniques used to remove the existing sealant or joint filler will be determined by the material in the joint and by available equipment. The old sealant can be removed by cutting and/or saw cutting, which slightly widens the joint to produce a new surface for sealant. Some materials, compression seals for example, are simply pulled out of the joint and then sandblasted to remove the lubricant/adhesive.

After removing previous materials, the joint is immediately high-pressure water washed to remove sawing residue. The high-pressure water wash should be applied in one direction (forward) to prevent recontamination. When the joint has dried, it should be sandblasted, using techniques described previously, to remove any residual dust. After sandblasting, the joint should be blown out with oil-free, water-free compressed air at 90 psi to remove sand and dust.

As a final check before bond breaker and sealant installation, the joints should be inspected for residual dust and/or old sealing material. If dust or old sealing material remain, these contaminants should be removed using techniques described previously.

Concrete patching compounds should be primed with DOWSIL™ PR-1205 Prime Coat before applying the backer rod and sealant to the joint.

When sealing random cracks in concrete, the cracks should be dry. The cracks should be sawn to a minimum of 1/4- x 1/2-inch depth and the dust removed with oil-free compressed air. Moving cracks should have a bond breaker placed along the bottom of the joint; non-moving cracks do not require bond breaker. Joint sealants should be recessed below the surface.

Silane Waterproofing

Cured silicone sealant can not be used with 100% silane water repellants. For further information contact your Dow Technical Service representative or visit dow.com/buildingscience.

Deck Coatings

Deck coatings will not bond to silicone sealants. Do not apply deck coatings over uncured sealants as cure retardation or inhibition can occur.

Maintenance

Damaged sealant can easily be repaired by cleaning the surrounding area with a solvent (do not use alcohol), cutting the damaged area out with a knife and resealing with the appropriate DOWSIL™ Parking Structure Sealant. Do not overfill the joint.

Sealant Application

Primer Installation

Primer should be installed with a clean rag or a brush giving a thin, uniform coat to the joint face. Primer must be dry before backer installation. See product data sheets to determine if priming is required. Primers must be allowed to dry for at least 60 minutes, have no puddles, and be dry to the touch before backer material installation.

Backer Material Installation

After the final cleaning, the backer material should be installed at the proper depth, as shown in Table III on Page 6. The depth is measured from the paved surface of the lowest slab (if faulting is present) to the top of the backer rod. Ensure that backer rod is applied in such a manner as to not wipe off primer during installation.

Backer rod may be installed by hand, but a roller device (Figure 5) to aid in placement can easily be constructed. This device will not only speed installation, but also ensures a consistent, uniformly placed backer at the proper depth.

Sealant Installation

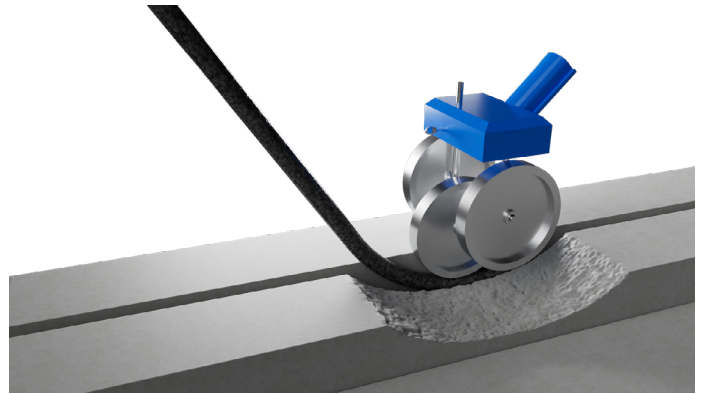
DOWSIL™ Parking Structure Sealants should be pumped directly from the original cartridge or pail into the joint by use of a hand- or air-powered gun. The nozzle should be moved steadily along the joint, pushing the sealant ahead to form a uniform bead. After proper backer rod installation, apply the sealants as follows:

- DOWSIL™ NS Parking Structure Sealant should fill the joint from the top of the backer rod to slightly below the concrete surface. Immediately after placement and before a skin forms, DOWSIL™ NS Parking Structure Sealant must be tooled in both directions (2-way tooled) so that it is forced against the joint faces and the bead is recessed below the concrete surface. (See Figure 1 on page 6.) This tooling is required because the material is not self-leveling and must be forced against the joint faces to wet them and gain maximum adhesion.
- DOWSIL™ SL Parking Structure Sealant and DOWSIL™ FC Parking Structure Sealant should fill the joint from the top of the backer rod to 1/4 to 1/2 inch below the concrete surface.

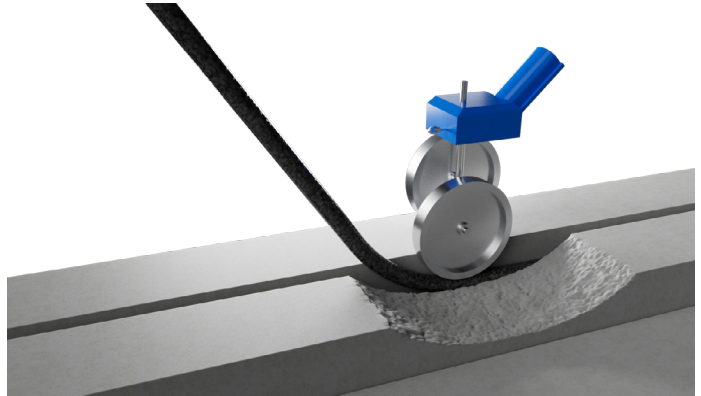


Figure 5. Backer Rod Installation Tools

Level Concrete



Uneven Concrete



Preferably, the sealant should be installed at temperatures above 40°F (4°C). However, the material has been installed at lower temperatures. Situations of this type require caution that the joint is clean, dry and frost-free. They should be discussed with your Dow representative before installation.

In new construction, where the concrete is deeply tined, it is recommended that the sealant be placed below the tining grooves. Thus, if concrete chipping occurs at the joint face, a watertight seal will be maintained. Excess sealant on the concrete surface should be scraped up and removed to prevent possible tracking.

Many devices for injecting and tooling the sealant are shop fabricated. The specific device selected depends largely upon the applicator's personal preference.

For DOWSIL™ NS Parking Structure Sealant, successful tooling has been achieved with such things as flexible spatulas and backer rods of larger diameter than the joint width. Flexible devices with "give" to them offer better results, because they are able to form the sealant to the contours of the concrete.

Recommended Primers and Equipment

DOWSIL™ PR-1205 Prime Coat is recommended with DOWSIL™ FC Parking Structure Sealant for use on concrete surfaces.

Equipment Recommendations: Two manufacturers have evaluated DOWSIL™ FC Parking Structure Sealant and recommend the following equipment for sealant application for 20-oz E-Z Pak sausage kits:

Albion Engineering Company Model #635-1 Air Gun

- No premixing required
- 1:1 mix ratio
- 90 psi maximum operating pressure (rated at 120 psi)
- Shoulder harness or wheel carriage optional

Cox North America Model CBA-600/s

- No premixing required
- 1:1 mix ratio
- 80 psi maximum operating pressure
- Built-in air regulator

Static Mixers: Laboratory and field testing of DOWSIL™ FC Parking Structure Sealant indicates that the following static mixers from TAH Industries and Albion Engineering Co. give good mixing and application results:

Disposable Unit

- 24 elements – 3/4-inch ID
- Series 140 female NPT (ready to attach to manifold)

Reusable Unit

- Stainless steel SST housing with disposable mixer
- 16 elements – 3/4-inch ID and 3/4-inch NPT steel pipe coupling

Equipment Contacts:

Albion Engineering Co.
2080A Wheatshaf Lane
Philadelphia, PA 19124
(215) 535-3476

TAH Industries
107 North Gold Drive
Robbinsville, NJ 08691-1699
(609) 259-9222

Cox North America
8181 Coleman Road
Haslett, MI 48840
1-800-822-8114
FAX: (517) 339-3806

PDX Expansion Joint System

The PDX³ Expansion Joint System is a revolutionary new concept in expansion joint construction and rehabilitation, combining a tough, wear-resistant polymer for expansion joint nosing and a rapid-curing, high movement silicone for joint sealing. The system, which is cold-applied, is specifically designed to provide a watertight, chemical-resistant seal to accommodate high traffic loads and remain pliable in cold and warm temperatures. Also, the silicone sealant in the system will bond to itself. This is ideal for maintenance applications where only one traffic lane can be sealed at a time, but where a continuous seal is required when the adjacent lanes are eventually sealed.

The rapid-curing ability of the PDX system makes it an excellent choice for parking decks and other high-volume traffic areas that require short closure times. These traffic areas may be opened shortly after complete installation of the PDX system.

The PDX system is also a cost-effective, easily repairable method for reconstruction of failed expansion joints, at a fraction of the cost of conventional joint repair alternatives.

System Components

Silspec 950 PDX: a two-component, 100 percent nonvolatile, rapid-curing liquid polymer. Due to its relatively low viscosity, Silspec 950 PDX is easy to mix and place. It cures to a dense, semi-flexible polymer that is resistant to chemicals, weather, abrasion and impact. When combined with Silspec Blended Aggregate, this product forms a polymer-based mortar for nosing or repair of expansion and construction joints on parking decks. Silspec 950 PDX can also be cured in the “neat” form as a combination sealant/primer for the silicone seal and as a protective coating for steel.

DOWSIL™ FC Parking Structure Sealant: a two-component, easy-to-install, 100 percent silicone rubber sealant designed to seal expansion joints. The rapid-curing ability of DOWSIL™ FC Parking Structure Sealant allows it to accommodate typical daily thermal movements and/or differential joint movement caused by traffic.

Note: DOWSIL™ FC Parking Structure Sealant is the **only** parking structure sealant that can be used with the PDX system.

Benefits and Applications

Upon curing, Silspec 950 PDX develops a tough, chemical-, wear- and impact-resistant surface for use in areas exposed to foot or vehicular traffic. Contact Silicone Specialties Inc. (SSI) for procedures for obtaining skid resistance.

Silspec 950 PDX is ideally suited for use as a binder for mortar preparations.

³U.S. Patent 5,190,395.

When combined with Silspec Blended Aggregate, it can be used for repairing damaged expansion and construction joints in bridges, roadway pavements and parking structures and making small repairs. It provides excellent protection from freeze-thaw cycles.

The PDX Expansion Joint System provides an alternative for strip seals, compression seals and elastomeric devices in new and renovated parking deck expansion joints and results in substantially improved performance at lower costs.

Cure Characteristics

Silspec 950 PDX will cure above 45°F (7°C). Silspec PNS Accelerator can be added to speed curing at low temperatures. Contact SSI for recommendations.

To decrease sag or “running” on steep inclines, additional aggregate may be added to modify viscosity. No modification of the material should be attempted without consulting SSI.

General Use Procedures

Shop drawings are available upon request from SSI.

Surface Preparation

Regardless of the substrate, Silspec 950 PDX must be applied to clean, dry and sound surfaces for an effective bond. All unsound materials must be removed from structurally sound substrates by jack-hammering, sandblasting or similar mechanical methods. All loose material must be removed by brushing, vacuuming or blowing. Old paint, rust or other coating must be removed by appropriate methods.

Asphalt/Bituminous Substrates: Observe above methods carefully. Do not use solvents.

Steel Substrates: Surface must be sandblasted to near-white condition.

Mixing

Silspec 950 PDX consists of two components: base and reactor. Before using, the components must be thoroughly mixed in the proper 1:1 ratio by volume. While small batches can be hand mixed with a clean spatula or wooden stick, the preferred method is mechanical mixing using slowspeed hand drills with paint-type paddle stirrers or a mortar mixer. Mix for at least 3 minutes; ensure thorough mixing from top to bottom as well as the sides of the container.

The blended batch must be applied to the surface in 10-15 minutes. Once spread, working time will be approximately 1/2 hour, depending upon the temperature. Clean equipment immediately with toluol, xylol, lacquer thinner or a mixture of clean aggregate and water.⁵

Caution: Water retards the cure of Silspec 950 PDX. If a mixture of clean aggregate and water is used to clean the mixer, extreme care must be taken to ensure that the mixer is thoroughly dry and any uncured material is removed prior to mixing new material.

Note: Do not mix more material than can be used at one time.

Application

Patching and Repairs: The mixed Silspec 950 PDX is made into a mortar by combining mixed polymer with Silspec Blended Aggregate in a 1:3.25 ratio by volume. Prime the surface with neat polymer before applying the mortar. Mortar must be placed and finished within 1/2 hour of mixing and before the prime coat is set. Two gallons of mixed Silspec 950 PDX, when combined with one bag (80 pounds) of Silspec Blended Aggregate, will yield approximately 0.7 cubic feet of mortar.

Cleaning: All tools, other application or mixing equipment must be cleaned at frequent intervals while the Silspec 950 PDX remains soft and uncured. For cleaning hand tools, solvents such as xylol, toluol and lacquer thinner are most effective.⁴ Waterless hand cleaner can also be used.

Cure: When the surface is hard enough to resist indentation with the flat head of a nail or screwdriver, it is ready for use. Patches of sufficient thickness can be ready for traffic in 1-4 hours, depending upon temperature.

Safe Use Information

During all operations, established safety codes and worker protection must be followed. Observe good housekeeping rules and regulations during all phases of use and handling of either unmixed or mixed product. Minimize skin contact by using protective creams, clothing, goggles and rubber gloves. Read and follow all handling precautions on labels. Use common sense when handling Silspec 950 PDX and all other chemicals. Avoid prolonged breathing of possible fumes; ample ventilation should be provided during all sandblasting, mixing and application procedures.

If material gets into eyes, flush thoroughly with clean water for 20 minutes and seek medical attention. Always wash exposed areas immediately, using warm water and soap and followed with a clear-water rinse. Observe all safety precautions when using any type of solvent for cleaning tools or equipment.

In accordance with ICC Regulation #49, Item 173.4: Containers containing less than 1 fluid ounce of liquid are considered nonhazardous material. Empty containers may be crushed and disposed of in accordance with local, state and federal regulations.

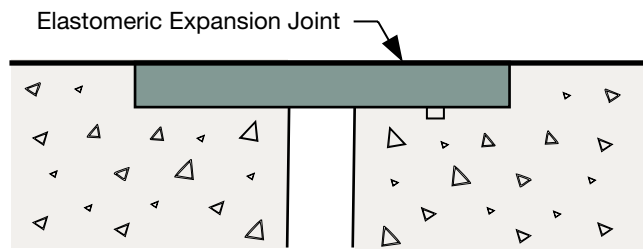
⁵Follow solvent manufacturer's recommended safe handling instructions.

Replacement T-Joint or Elastomeric Expansion Joint

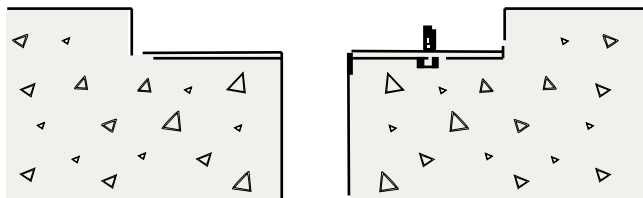
1. Remove failed joint device. Any studs extending from base should be removed if loose, otherwise they may remain in place.
2. Sandblast sides and bottom of shelf to clean/sound concrete or steel. If steel base plate is in place, it must be sandblasted to white metal.
3. Blow joint opening and shelf with oil-free compressed air to remove laitance and debris from sandblasting operations.
4. Install joint width form (polystyrene foam) in joint opening to a height level with the driving surface.
5. Prime bottom and sides of shelf with Silspec 950 PDX "neat" primer.
6. Mix and install Silspec 950 PDX with aggregate per directions, making sure to consolidate material thoroughly. Screed material level with top of form and level with driving surface. If a light-colored surface is desired, broadcast extra aggregate onto the top of nosing and "pat in" with trowel.
7. Allow Silspec 950 PDX with aggregate to cure per data sheet. Silspec 950 PDX with aggregate must be tack-free and firm to the touch before proceeding.
8. Remove form from new joint opening and lightly sandblast to remove all plastic residue.
9. Prime faces of joint with a light brush coating of DOWSIL™ PR-1205 Prime Coat and allow to dry.
10. Place an appropriately sized backer rod to the correct depth (1 to 1-1/4 inch) in new joint opening.
11. Mix and place DOWSIL™ FC Parking Structure Sealant in joint opening.

Note: Although the illustrations do not show this, the edges of Silspec 950 PDX should be ground to a 1/4-inch bevel.

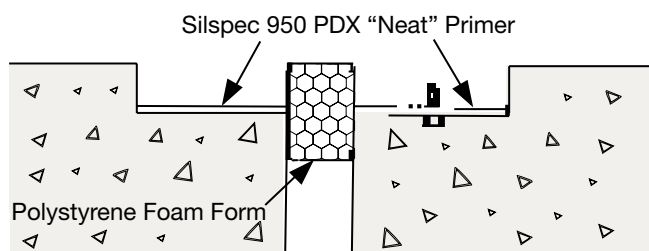
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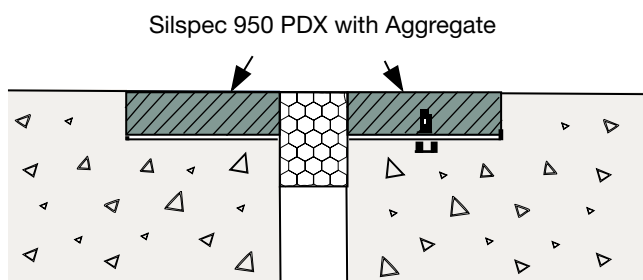
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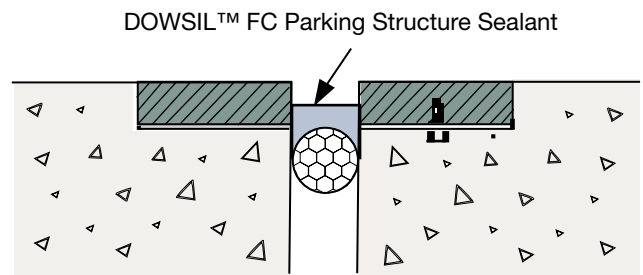
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7-11



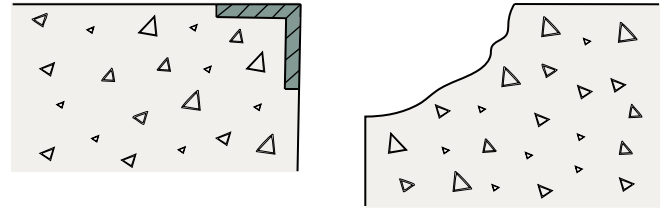
Armor Joint

1. Remove any loose steel armor.
2. Remove all damaged or loose material down to sound concrete.
3. Sandblast all surfaces (steel or concrete) to remove all surface contamination. Note: Blast steel to white metal. Concrete must be clean and dry.
4. Blow joint opening and shelf with oil-free compressed air to remove laitance and debris from sandblasting operations.
5. Prime bottom and sides of shelf and all steel surfaces that were sandblasted with Silspec 950 PDX "neat" primer. Let Silspec 950 PDX cure if no nosing repairs are needed; otherwise, continue to next step immediately.
6. If nosing repair is needed, install joint width form (polystyrene foam) in joint opening to a height level with the driving surface.
7. If nosing repair is needed, mix and install Silspec 950 PDX with aggregate per directions, making sure to consolidate material thoroughly. Screed material level with top of form and level with driving surface. If a light-colored surface is desired, broadcast extra aggregate onto the top of nosing and "pat in" with trowel.
8. Allow Silspec 950 PDX with aggregate to cure per data sheet. Silspec 950 PDX with aggregate must be tack-free and firm to the touch before proceeding.
9. If nosing repair was done, remove form from new joint opening and lightly sandblast to remove all plastic residue.
10. Prime faces of joint with a light brush coating of DOWSIL™ PR-1205 Prime Coat and allow to dry.
11. Place an appropriately sized backer rod the correct depth (1 to 1-1/4 inch) in the new joint opening.
12. Mix and place DOWSIL™ FC Parking Structure Sealant in the joint opening.

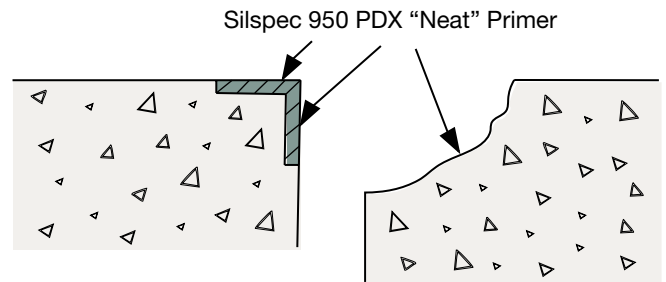
Note: Although the illustrations do not show this, the edges of Silspec 950 PDX should be ground to a 1/4-inch bevel.

1-4

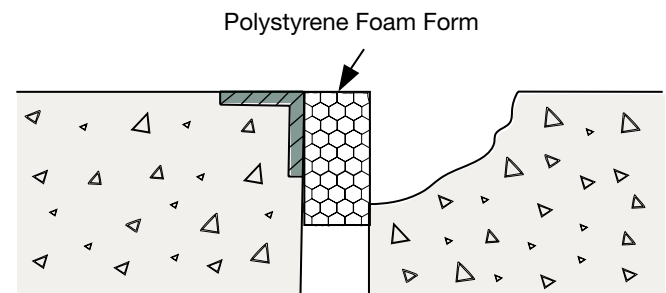
Armor Joint with One Side Broken Out



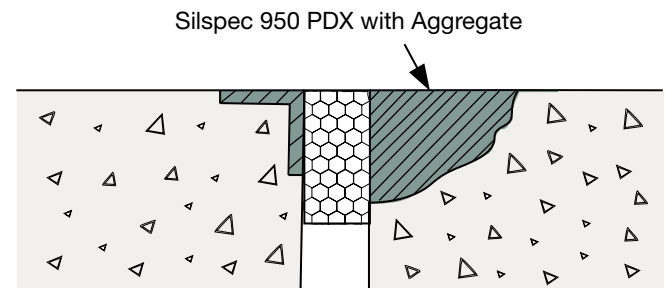
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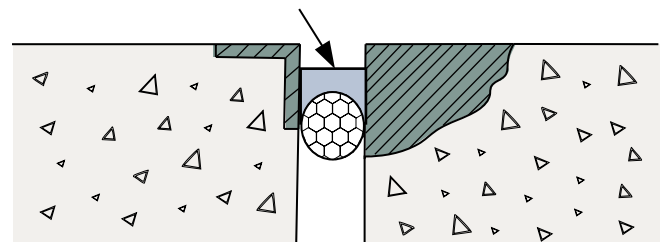


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DOWSIL™ FC Parking Structure Sealant

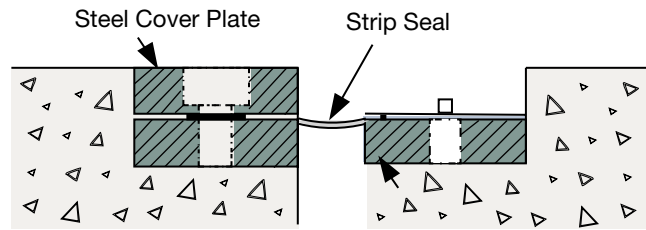


Strip Seal Joint

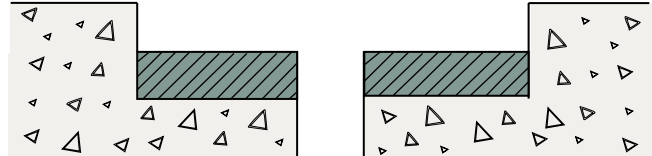
1. Remove steel cover plate and neoprene strip seal. Steel base plate should be removed if loose.
2. Sandblast sides and bottom of shelf to clean/sound concrete or steel. If steel base plate is in place, it shall be sandblasted to white metal.
3. Blow joint opening and shelf with oil-free compressed air to remove laitance and debris from sandblasting operations.
4. Install joint width form (polystyrene foam) in joint opening to a height level with the driving surface.
5. Prime bottom and sides of shelf with Silspec 950 PDX "neat" primer.
6. Mix and install Silspec 950 PDX with aggregate per directions, making sure to consolidate material thoroughly. Screed material level with top of form and level with driving surface. If a light-colored surface is desired, broadcast extra aggregate onto the top of nosing and "pat in" with trowel.
7. Allow Silspec 950 PDX with aggregate to cure per data sheet. Silspec 950 PDX with aggregate must be tack-free and firm to the touch before proceeding.
8. Remove form from new joint opening and lightly sand blast to remove all plastic residue.
9. Prime faces of joint with a light brush coating of DOWSIL™ PR-1205 Prime Coat and allow to dry.
10. Place an appropriately sized backer rod to the correct depth (1 to 1-1/4 inch) in new joint opening.
11. Mix and place DOWSIL™ FC Parking Structure Sealant in the joint opening.

Note: Although the illustrations do not show this, the edges of Silspec 950 PDX should be ground to a 1/4-inch bevel.

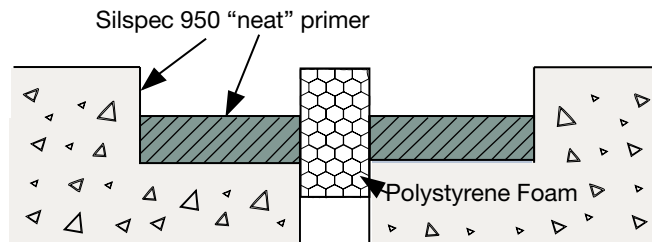
1 Damaged Strip Seal Expansion Joint



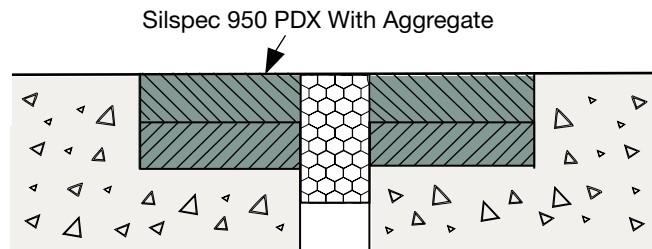
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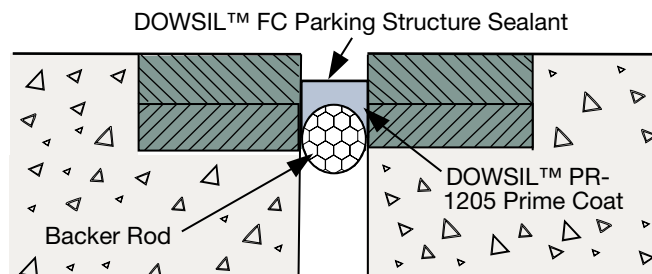
4-5 Install form. Prime bottom and back of shelf with Silspec 950 "neat" primer.



6-8 Mix and place Silspec 950 PDX per directions; finish flush with surface. Allow to harden and remove form.



9-11 Lightly sandblast joint faces. Prime with DOWSIL™ PR-1205 Prime Coat. Install backer rod and DOWSIL™ FC Parking Structure Sealant. Open to traffic.

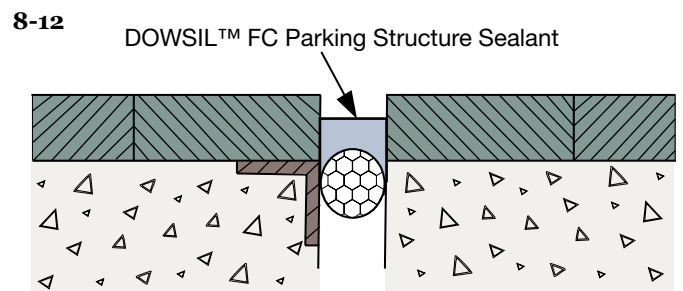
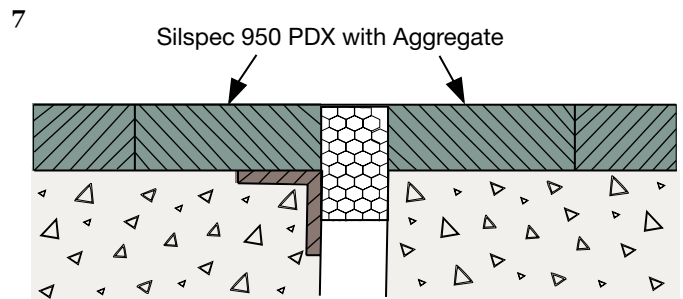
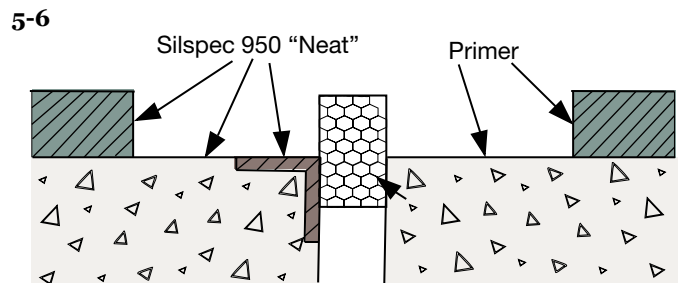
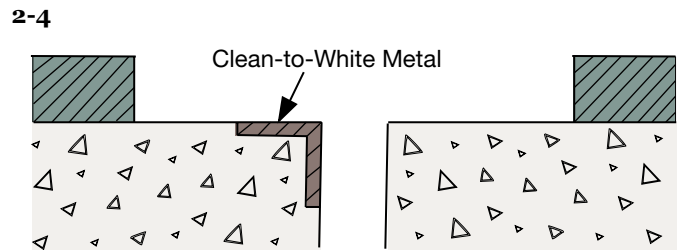
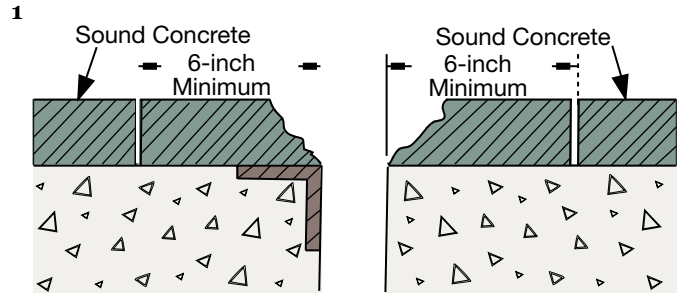
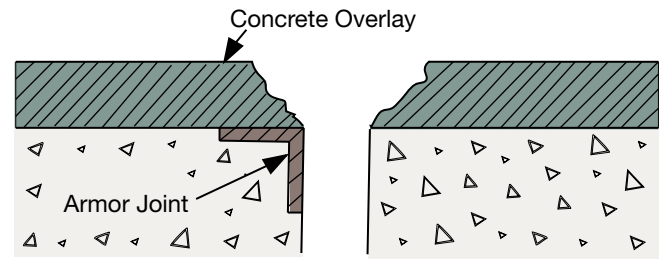


Concrete Overlay

1. Saw overlay parallel to and a minimum of 6 inches back from actual joint opening in parking deck on both sides of the joint. Parallel cut must be in sound concrete. Saw cut should extend full depth through overlay.
2. Remove overlay material within sawed areas down to concrete subsurface, then clean concrete surface to expose aggregate in concrete deck.
3. Sandblast sides and bottom of shelf to clean/sound concrete. Note: For steel armored joints, sandblast all rust from top of angle.
4. Blow joint opening and shelf with oil-free compressed air to remove laitance and debris from sandblasting operations.
5. Install joint width form (polystyrene foam) in joint opening to a height level with the driving surface.
6. Prime bottom and sides of shelf with Silspec 950 PDX "neat" primer.
7. Mix and install Silspec 950 PDX with aggregate per directions, making sure to consolidate material thoroughly. Screed material level with top of form and level with driving surface. If a light-colored surface is desired, broadcast extra aggregate onto the top of nosing and "pat in" with trowel.
8. Allow Silspec 950 PDX with aggregate to cure per data sheet. Silspec 950 PDX with aggregate must be tack-free and firm to the touch before proceeding.
9. Remove form from new joint opening and lightly sandblast to remove all plastic residue.
10. Prime faces of joint with a light brush coating of DOWSIL™ PR-1205 Prime Coat and allow to dry.
11. Place an appropriately sized backer rod to the correct depth (1 to 1-1/4 inch) in new joint opening.
12. Mix and place DOWSIL™ FC Parking in the joint opening.

Note: Although the illustrations do not show this, the edges of Silspec 950 PDX should be ground to a 1/4-inch bevel.

Existing Overlay Breaking Out at Expansion Joint



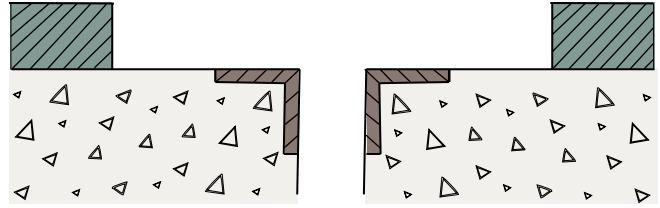
Resizing Overlay Joints

While the system is not intended to correct insufficient joints in the original parking structure, it can be used for resizing joints in the overlay.

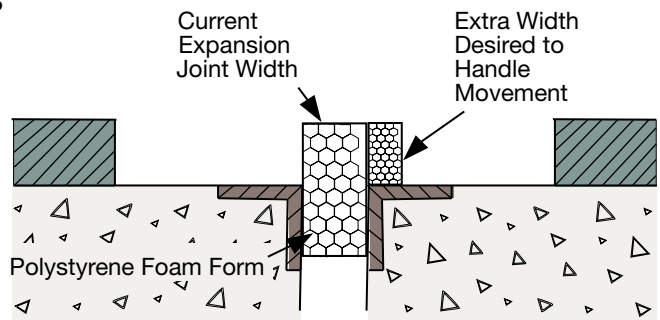
1. Joints may be resized provided the new joint can be formed with sufficient depth to accommodate the bond breaker, the sealant and the proper recess. Joints that have closed beyond functional limits can be resized using a polystyrene foam form of sufficient width to form a new joint wide enough to accommodate the anticipated movement.
2. Cleaning and preparation are the same as detailed for each joint type.
3. Sandblast all surfaces (steel or concrete) to remove all surface contamination. Note: Blast steel to white metal. Concrete must be clean and dry.
4. Blow joint opening and shelf with oil-free compressed air to remove laitance and debris from sandblasting operations.
5. Install joint width form (polystyrene foam) in joint opening to a height level with the driving surface.
6. Prime bottom and sides of shelf with Silspec 950 PDX "neat" primer.
7. Mix and install Silspec 950 PDX with aggregate per directions, making sure to consolidate material thoroughly. Screed material level with top of form and level with driving surface. If a light-colored surface is desired, broadcast extra aggregate onto the top of nosing and "pat in" with trowel.
8. Allow Silspec 950 PDX with aggregate to cure per data sheet. Silspec 950 PDX with aggregate must be tack-free and firm to the touch before proceeding.
9. Remove form from new joint opening and lightly sandblast to remove all plastic residue.
10. Prime faces of joint with a light coating of DOWSIL™ PR-1205 Prime Coat and allow to dry.
11. Place an appropriately sized backer rod to the correct depth (1 to 1-1/4 inch) in new joint opening.
12. Mix and place DOWSIL™ FC Parking Structure Sealant in the joint opening.

Note: Although the illustrations do not show this, the edges of Silspec 950 PDX should be ground to a 1/4-inch bevel.

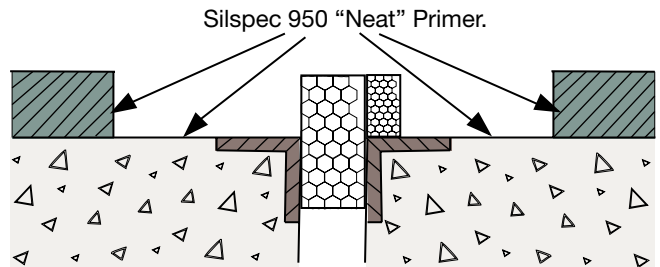
- 1-4** Concrete overlay over armor joint. Expansion joint not large enough to handle parking structure movement.



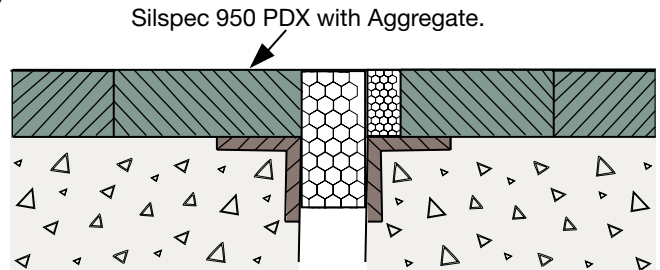
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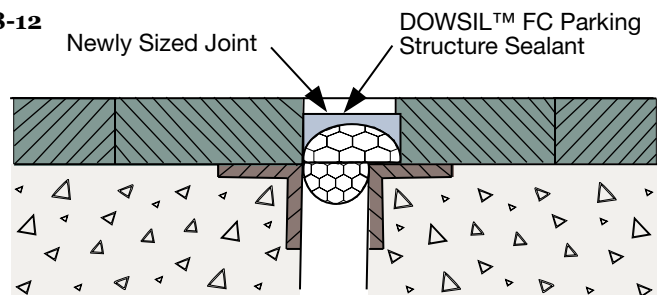
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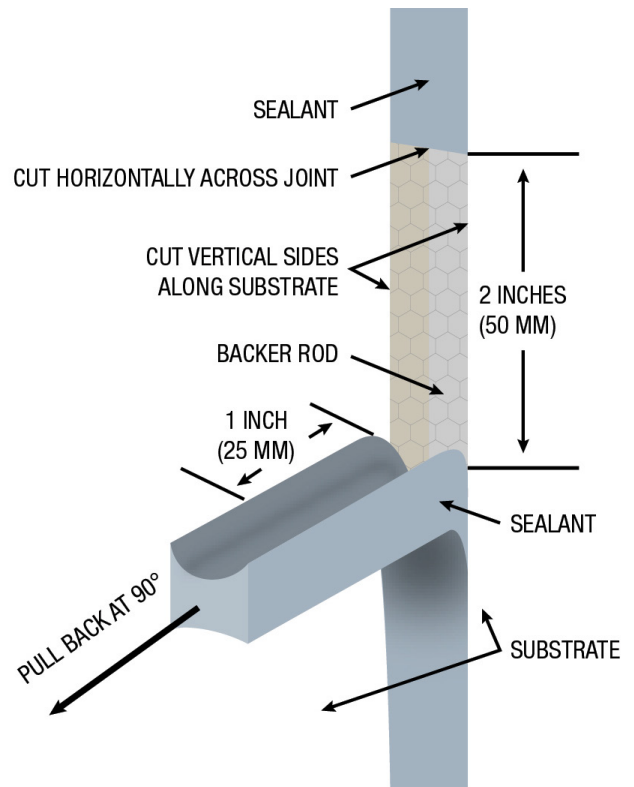


Standard Field Adhesion Hand Pull Test

The field adhesion test is a simple screening procedure that may help detect application problems such as improper cleaning, use of improper primer, poor primer application or improper joint configuration. **As a check for adhesion, a simple hand pull test is required at the job site after the sealant is fully cured (usually within 7 to 21 days).** Field adhesion testing should be documented using the Field Adhesion Testing Log. It is suggested that 10 tests for the first 1,000 feet and one test per thousand feet thereafter be submitted or one test per floor per elevation. The hand pull test procedure is as follows:

1. Make a knife cut horizontally from one side of the joint to the other.
2. Make two vertical cuts (from the horizontal cut) approximately 3 inches long, at both sides of the joint.
3. Place a 1-inch mark on the sealant tab as shown in the illustration.
4. Grasp the 2-inch piece of sealant firmly just beyond the 1-inch mark and pull at a 90° angle.
5. If dissimilar substrates are being sealed, check the adhesion of sealant to each substrate separately. This is accomplished by extending the vertical cut along one side of the joint, checking adhesion to the opposite side and then repeating for the other surface.
6. The adhesion test is considered passing when 1 inch of sealant is elongated to 4 inches without bond loss.

Figure 6. Hand Pull Test



Field Adhesion Testing Log

[illegible]

Warranty Information — Please Read Carefully

Dow and Silicone Specialties Inc. (SSI) believe that the information in this publication is an accurate description of the typical characteristics and/or uses of the product or products, but it is your responsibility to thoroughly test the product in your specific application to determine its performance, efficacy and safety. Suggestions of uses should not be taken as inducements to infringe any particular patent.

Unless Dow provides you with a specific written warranty of fitness for a particular use,

Dow's sole warranty is that DOWSIL™ Parking Structure Sealants will meet current sales specifications. Dow specifically disclaims any other express or implied warranty, including the warranties of merchantability and of fitness for use. Your exclusive remedy and Dow's sole liability for breach of warranty is limited to refund of the purchase price or replacement of any product shown to be other than as warranted, and Dow expressly disclaims any liability for incidental or consequential damages.

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For more information about the PDX Expansion Joint System, contact:

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(918) 587-5567



Dow Building Science website:
dow.com/buildingscience



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