BUILDING SCIENCE

Infrastructure sealants built to last

Sealant selection guide


We’re helping to keep the world moving by strong innovation and more sustainable practices with proven, durable materials.

A guide to DOWSIL™ Sealant technologies for infrastructure

Durability is a key requirement for modern infrastructure projects – highways and roads, bridges, airports and airfields, walkways and plazas, parking structures and stadiums. Miles of concrete must be designed to accommodate significant movement – especially in the joints – caused by unrelenting weather, temperature extremes, UV radiation and chemicals, such as de-icing materials and fuels. Dow offers a broad portfolio of technologies and expertise to support your infrastructure projects.

There are many different technologies used in infrastructure sealing applications – especially for joints exposed to high temperatures and UV, where long-term durability is necessary. Some of the demanding requirements for sealants in highway, airport and other infrastructure applications include:

- Watertight and long-lasting joints
- Accommodating extreme movements
- No cracking
- Excellent weatherability
- Fast and easy installation
- Long service life

Dow provides silicone technologies which offer excellent durability, long-term adhesion, and elastic recovery and elongation – without cracking over time. These silicones offer exceptional performance under long-term UV exposure and high temperatures. Unlike other technologies, DOWSIL™ Silicone joint sealants don't crack, crumble, dry out or become brittle. They remain flexible and resilient years after installation, supporting long-lasting and watertight joints. Whether it is for new joints or refurbishment of existing joints, DOWSIL™ Silicone pavement sealants are proven, offering excellent performance in concrete-to-concrete, concrete-to asphalt, concrete-to-steel and steel-to-steel expansion joints in horizontal and vertical applications. DOWSIL™ pavement joint sealants are cold applied without the need for heating or other special preparation. Suitable for application over a wide temperature range, they cure using moisture in the air, and the skin-over time is one hour or less – allowing roadways to be opened to traffic quickly.

For excellent durability, silicone sealants are the technology of choice. They are flexible. Every DOWSIL™ pavement silicone joint sealant has a movement capability of 100% expansion and 50% compression once cured. Silicones resist hardening in cold temperatures and softening in warm weather. They have excellent weatherability and are virtually unaffected by rain, snow, sunlight, ozone or temperature extremes.

Flexibility and durability for the well-traveled road

DOWSIL™ 888 Silicone Joint Sealant

- High durability – weather and UV resistant
- Accommodates extreme movement – 100% extension and 50% compression
- Short term fuel resistance
- Ready to apply, one-part sealant
- Primerless adhesion to concrete

DOWSIL™ 888 Silicone Joint Sealant can be used with a primer for concrete-to-steel and steel-to-steel joints, and can seal joints that are not uniform in width or have minor spalling. It is weather and UV resistant, as well as fuel resistant for short-term exposure.

This low-modulus sealant is ready to use as supplied and is dispensed directly from the bulk container into the joint – by hand or with an air-powered pump. It can be extruded from -30 to 50°C. Recommended maximum joint width for typical applications as airport runway or taxiways is two inches (5.08 cm).

(Note: It should NOT be used with asphalt, as the product's modulus might be high enough to induce additional stress, which could lead to asphalt substrate spall when subject to joint movement.)

DOWSIL™ 890-SL Silicone Joint Sealant

- Self-leveling sealant – no tooling required, ready to apply
- High elongation
- High durability – weather and UV resistant
- Accommodates extreme movement – 100% extension and 50% compression
- Short term fuel resistant
- Primerless adhesion to concrete and asphalt

This self-leveling, one-part sealant can be used for concrete-to-concrete and concrete-to-asphalt pavement joints without a primer. With a primer, it also can be used for concrete-to-steel and steel-to-steel joints. It will flow into irregularly shaped and spalled joints with no tooling required.

This ultra-low-modulus sealant is ready to use as supplied. An ultra-low modulus is important for asphaltic paving to help ensure minimal stress is placed on the joint face. It can be extruded from -30 to 50°C. The cured silicone rubber remains flexible from -30 to 150°C. It is weather and UV resistant, as well as fuel resistant for short-term exposure. Recommended maximum joint width for typical applications is two inches (5.08 cm).

DOWSIL™ 902 RCS Joint Sealant

- Rapid cure – increased efficiency
- Self-leveling sealant – no tooling required, easy to use two-part silicone
- High durability – weather and UV resistant
- Short term fuel resistance
- High elongation
- For wide joints
- Proven performance with concrete, asphalt, steel, etc.

This rapid-cure, self-leveling, two-part sealant can be used for concrete-to-concrete, concrete-to-asphalt, concrete-to-steel and steel-to-steel expansion joints. The typical applications are bridge or highway expansion joints that vary in width from 25 to 76 mm.

This sealant's rapid cure makes it especially well-suited for maintenance work where resealing must be completed within a short period of time to minimize traffic disruption. Its rapid cure develops sufficient integrity within eight hours to accommodate movements associated with bridges. With all-temperature gunnability, this ultra-low modulus, self-leveling sealant will seal irregularly shaped and spalled joints with no tooling required. Under normal conditions, this sealant remains rubbery from -45 to 150°C without cracking, tearing or becoming brittle.

The two-part formulation offers the ease of a one-part installation – with no pre-mixing or measuring required. DOWSIL™ 902 RCS Sealant is available in convenient EZ Pak sausages, making it easy to load, use, dispose and minimize material waste.

The two EZ Pak sausages (592 mL each) are easily dispensed in a 1:1 ratio with a dual-sausage pneumatic gun. The sealant components are also available in larger bulk pails.

Roads carry people and goods multiple trillions of miles each year – the equivalent of hundreds of round trips between Earth and Pluto.

Table 1: Substrate applications for DOWSIL™ silicone joint sealants

	Substrate joint applications				
	Concrete	Asphalt	Steel	Polymer nosing	Recommended use
DOWSIL™ 888 Silicone Joint Sealant	Primerless	Not applicable	Use primer	Use primer	Airport runways, taxiways, tarmacs, and concrete aprons, roads and highways, parking lots and decks, distribution center exterior flatwork
DOWSIL™ 890-SL Silicone Joint Sealant	Primerless	Primerless	Use primer	Use primer	Airport taxiways, tarmacs, and concrete aprons, roads and highways, parking lots and decks, distribution center exterior flatwork
DOWSIL™ 902 RCS (Rapid Cure Silicone) Joint Sealant	Use primer	Primerless	Use primer	Use primer	Bridges or highway expansion joints in need of a faster-cure product that reduces downtime for pavement joint repair or maintenance

Contact Dow or review the technical data sheet for primer and testing recommendations.

Table 2: Certifications and approvals

DOWSIL™ 888 Silicone Joint Sealant	DOWSIL™ 890-SL Silicone Joint Sealant	DOWSIL™ 902 RCS (Rapid Cure Silicone) Joint Sealant
• ASTM D 5893 Type NS • FAA P-605 for silicone joint sealants • Meets SS-S-200E (Section 4.4.12) • JC/T976 - SR I N 25LM grade **Flame Test Requirements** • EN14187-5 Hydrolysis • C920 Type S, Grade NS, Class 100/50, Use O (Concrete)	• ASTM D 5893 Type SL • FAA P-605 for silicone joint sealants • Meets SS-S-200E (Section 4.4.12) • JC/T976 -SR I S 25LM grade **Flame Test Requirements** • EN14187-5 Hydrolysis • EN14188-2 Class B, C, D • C920 Type S, Grade P, Class 100/50, Use O (Concrete)	• ASTM C 920 Type M, Grade P, Class 100/50, Use T2, NT, M

Table 3: Typical properties of DOWSIL™ silicone joint sealants

Property	Test	DOWSIL™ 888 Silicone Joint Sealant	DOWSIL™ 890-SL Silicone Joint Sealant	DOWSIL™ 902 RCS (Rapid Cure Silicone) Joint Sealant
Components		One-part	One-part	Two-part
Color		Gray	Dark gray	Dark gray (mixed)
Flow, sag or slump		Non-sag	Self-leveling	Self-leveling
Extrusion rate, minimum, per minute	ASTM C 1183	72 mL	231 mL	Part A: 354 g Part B: 308 g
Extrusion temperature range		-30°C to 50°C (-22°F to 122°F)	-30°C to 50°C (-22°F to 122°F)	-30°C to 50°C (-22°F to 122°F)
Skin-over time, 25°C, 50% RH		<1 hour	<1 hour	12 min
Tack-free time	ASTM C 679	<1 hour	<2 hours	50 min
Full cure @ 23°C, 50% RH (13 x 13 x 51 mm)		14-21 days	14-21 days	24-48 hours
Ultimate elongation	ASTM D 412	>1,000%	>1,400%	>1,200%
Tensile strength @ 150%	ASTM D 412	28 psi (193 kPa)	9 psi (62 kPa)	9.9 psi (68 kPa)
Joint movement capability, +100/-50%, 10 cycles	ASTM C 719	Pass	Pass	Pass
Accelerated weathering, 5,000 hours	ASTM C 793	Pass	Pass	Pass
Packaging		• 591 mL sausage • 17 L/4.5 gallon bulk pails • 189 L/50 gallon bulk drums	• 591 mL sausage • 17 L/4.5 gallon bulk pails • 189 L/50 gallon bulk drums	• Kit with two 592 mL/ 20 oz EZ Pak sausages • Kit with two 17 L/ 4.5 gallon bulk pails

These are typical properties, not to be construed as specifications.
For more information, please refer to the individual technical data sheets.

Airfield application test method

Since there are few federal or ASTM specifications presently written for silicones, Dow developed a test method to verify that silicone sealants can meet the requirements for airfield applications. A simulated fuel spill test joint was chosen along with ASTM C 719 cyclic testing. This test joint in combination with C 719 appeared to be a more accurate depiction of actual field conditions. During the initial contact with some fluids, the test joints showed some visual volume increase. However, after dissipation of the fluids, these same test joints did return to their original shape (see Figure 1 and Table 4). More importantly, after further subjecting the same test joints to cyclic testing (after fluid dissipation), they showed no signs of bond loss.

The airfield application test method from Dow is a good indication that DOWSIL™ Silicone products continue to provide the necessary airfield performance requirements.

Figure 1: Effect of fuel spill on DOWSIL™ silicone joint sealant

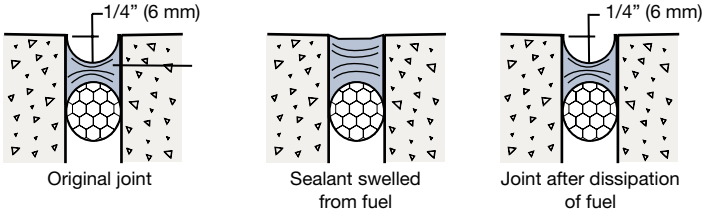

Table 4: Approximate volume change after exposure to fluids

Percent volume swell – visual		
Fluid	**DOWSIL™ 888 Silicone Joint Sealant**	**DOWSIL™ 890-SL Silicone Joint Sealant**
JP-4 (%)	5	15-20
Skydrol B	None	None
50/50 Glycol/H_2O	None	None
Hydraulic fluid	None	None

After drying, all samples passed +100/-50% movement testing

DOWSIL™ infrastructure sealants in action

Eglin Air Force Base

Florida, USA

For long-term performance and resistance to jet fuel, hydraulic oils and high-temperature jet blasts, DOWSIL™ 888 and DOWSIL™ 890-SL Silicone Joint Sealants were used on the taxiways and parking aprons at the base.

Colorado Department of Transportation

Colorado, USA

DOWSIL™ 902 RCS Joint Sealant, a rapid cure silicone, helped highway officials cost-effectively reseal and protect Glenwood Canyon bridges – with easy installation to minimize the road closure time.

Kennedy Space Center

Florida, USA

DOWSIL™ 888 and DOWSIL™ 890-SL Silicone Joint Sealants were used at NASA's Shuttle Landing Facility to replace failing neoprene rubber compression seals.

Joint Base Andrews

Maryland, USA

Runways used by Air Force One must be in top condition at all times. Nearly 300,000 linear feet of DOWSIL™ 888 and DOWSIL™ 890-SL Silicone Joint Sealants were used when the base's massive, primary runway was reconstructed.

Leading expertise & service

Digital information sharing

Search our product catalog at **dow.com/buildingscience** for quick and easy access to more information and technical documentation concerning our product range.

Dow's dedicated project support team works closely with engineers and consultants around the world – offering support, specification advice and training opportunities

Dow technical training workshops

Dow is more than just your supplier of silicone and organic materials. We are happy to collaborate with you during every stage of your project – from concept to completion. This starts by sharing our proven experience in silicone sealants and adhesives.

Discover and join some of our regional training workshops (**dow.com/TrainingAcademy**) held in various locations, such as the Inspiration Studio at Dow Silicone Belgium SPRL. To learn more about these and future collaborations, please contact your Dow representative.

Quality matters

Dow has developed comprehensive application guidelines for the infrastructure sealant range – as application and quality are key – offering a procedure which consistently tracks and controls quality during application. Once sealants have been properly applied following our quality control guidelines and documentation, applicators have access to a product warranties.

COOL (COnstruction OnLine)

Efficient processes are paramount in enabling both you and your customers to run a project smoothly and on time. That's why we support you with our user-friendly COOL online planning tool during the planning phase and over the course of the project.

A modern and efficient way to handle projects, COOL offers support for design planning, joint calculation, laboratory tests and service and warranty inquiries through an intuitive user interface. Service and warranty inquiries are also accelerated and simplified considerably, thanks to the project data stored in COOL. Find out more at **dow.com/cool**.

COOL

Providing excellent durability, long-term adhesion, elastic recovery and elongation – without cracking over time – Dow offers proven performing sealants for more sustainable infrastructure.

For more information

Learn more about Dow's full range of High Performance Building solutions, including service and support, at **dow.com/buildingscience**.

Dow has sales offices, manufacturing sites, science and technology laboratories around the globe. Find local contact information at **dow.com/contactus.**

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