



# Strengthening Infrastructure with Spray Sealers

**SPRAY SEALERS CAN BE A VITAL COMPONENT** in concrete pavement preservation (CPP) due to their role in extending the lifespan and maintaining the integrity of concrete surfaces.

By acting as water repellents, pore blockers or surface densifiers, these penetrating sealers can act as the first line of defense against water intrusion, chloride penetration and freeze-thaw cycles. The benefits, applications and technological advancements of spray sealers for concrete roads, highways and runways, underscore the important role they play in modern infrastructure management.

Their value is further emphasized in a research study from The National Concrete Pavement Technology Center (CP Tech Center) at Iowa State University. The study evaluated penetrating sealers for concrete using several test methods to assess penetrating sealants using a wide range of available products under several failure modes. Their report, "[Evaluation of Penetrating Sealers for Concrete](#)," concluded that sealers can help improve the longevity of concrete surfaces and that they can, to an extent, compensate for mixtures at risk for premature deterioration.

## » ADDRESSING CONCRETE DURABILITY CHALLENGES

Concrete surfaces in transportation infrastructure endure unrelenting exposure to environmental and operational extremes such as heavy traffic loads, deicing salts and temperature fluctuations. These stressors can promote moisture and ion penetration, triggering structural issues like scaling, cracking and loss of load-bearing capacity. Without intervention, such degradation can compromise the safety and functionality of roadways and runways, leading to frequent disruptions and costly repairs.

## » ROLE OF SPRAY SEALERS IN PAVEMENT PRESERVATION

Spray sealers are designed to enhance durability by creating an impermeable barrier at the surface of the concrete while still al-

lowing water vapor to escape. This balance ensures the concrete can release moisture, reducing its saturation levels and susceptibility to freeze-thaw damage. In addition, spray sealers are known to reduce chloride penetration, stave off chemical reactions and maintain aesthetic quality over time. Since they penetrate the concrete's pores and chemically react with its structure, they can offer improved performance compared to traditional surface coatings, even on sub-optimal concrete mixes.

The key benefits of spray sealers include:

- **Water Resistance:** Creating a hydrophobic barrier that repels moisture and reduces chloride penetration.
- **Pore Blocking and Surface Densification:** Lowering absorption rates and permeability to sustain long-term durability.
- **Vapor Permeability:** Enabling moisture to escape from the surface, reducing the likelihood of distress mechanisms like freeze-thaw cracking.
- **Application Versatility:** Suitable for both new and existing pavements, including areas already showing signs of early distress.

These features make spray sealers an option for maintaining the integrity and functionality of concrete surfaces in even the most demanding scenarios.



## » GENERAL APPLICATIONS

### 1. Highway Preservation

Highways are particularly vulnerable to chloride ingress from de-icing salts during winter, potentially accelerating deterioration at joints and driving lanes. By applying spray sealers along these critical points, construction crews have successfully reduced moisture permeability and slowed the progression of chloride ions into the concrete substrate. Studies have shown that highways treated with penetrating sealers exhibit significantly reduced scaling and maintain surface smoothness longer than untreated pavements.



### 2. Runway Maintenance

Airports require infrastructure capable of withstanding extreme usage and environmental conditions. Spray sealers have been used to protect runways from freeze-thaw damage and ensure surface friction remains intact. In addition to the ease of application, spray sealers allow maintenance crews to treat large-scale runway sections quickly without causing excessive operational disruptions. By forming a hydrophobic but vapor-permeable layer, these sealers allow the concrete to handle extreme environmental conditions while resisting moisture-related damage.

### 3. Rural Road Resilience

On rural concrete overlays, where freeze-thaw cycles and water infiltration at joints can affect performance, the use of spray sealers has demonstrated extended durability. Penetrating sealers with combined pore-blocking and water-repelling properties are particularly effective in safeguarding these roadways, ensuring smoother travel conditions and reducing the need for frequent maintenance interventions.

## » TECHNOLOGICAL ADVANCEMENTS IN SPRAY SEALERS

The evolution of spray sealers has dramatically improved their effectiveness and adoption across various sectors. Advances include:

- **Optimized Penetration Depth:** Modern sealers now achieve deeper penetration into existing concrete, ensuring protection beyond surface wear.
- **Eco-Friendly Compositions:** Some products are developed entirely from natural materials, protecting infrastructure without harmful environmental impacts—a milestone in aligning sustainability with durability.
- **Longevity in Performance:** Many penetrating sealers now offer effectiveness lasting over a decade, reducing the need for reapplication and minimizing operational downtime. Some products strengthen, protect and harden concrete pavements, extending the service life up to 35% and reducing wear at rates greater than 30%. This is worth consideration, particularly on concrete that has soft polish-prone aggregates.

## » THE FUTURE OF CONCRETE PRESERVATION

Spray sealers continue to feature prominently in strategies to maintain and enhance the performance of transportation infrastructure. Their proven ability to safeguard concrete surfaces and extend their usability—even in extreme environments—makes them a valuable tool for contractors, municipalities and transportation agencies worldwide.

From highways to runways, spray sealers are being utilized, lowering maintenance frequency and offering a more sustainable infrastructure investment. By integrating them into pavement preservation programs, the longevity and reliability of vital infrastructure assets can be enhanced, paving the way for a more resilient and efficient transportation network.

#### ABOUT IGGA

The International Grooving & Grinding Association (IGGA) is a non-profit trade association founded in 1972 by a group of dedicated industry professionals committed to the development of the diamond grinding and grooving process for surfaces constructed with Portland cement concrete and asphalt. In 1995, the IGGA joined in affiliation with the American Concrete Pavement Association (ACPA) to form what is now referred to as the Concrete Pavement Preservation Partnership (IGGA/ACPA CP3). The IGGA/ACPA CP3 now serves as the lead industry representative and technical resource in the development and marketing of optimized pavement surfaces, concrete pavement restoration and pavement preservation around the world.