Joint Resealing and Crack Sealing

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Joint Resealing and Crack Sealing

- Placement of an approved sealant material in an existing joint or crack to reduce moisture infiltration and prevent intrusion of incompressibles

Joint Resealing

When to Reseal: Project Selection

- Reseal when existing sealant no longer functional
- Pavement not severely deteriorated
- In conjunction with other preservation activities

Example joint sealant failures

If joints were originally sealed, continue to keep those joints sealed

Joint Resealing

- Sealant Materials
  - Hot Pour Crack and Joint Filler
    - Comply with Iowa DOT Section 4136.
  - Emulsified Asphalt Crack Filler
    - Provide CRS-2 or CRS-2P emulsions complying with Iowa DOT Section 4140
  - ASTM D6690, Type IV

Joint Resealing
Performance

- Typical performance
  - 8 to 16+ years for quality materials
  - Longer performance lives are achievable

~20-year old hot-poured sealant

Joint Resealing

Backer Rod – LIMITED USE!

- Use <u>only</u> on wide joints or cracks to fill void
- Purpose:
  - Achieves shape factor
- Compatible with sealant type
- Diameter = 25% greater than joint width
- Iowa does not allow in new construction

Closed Cell

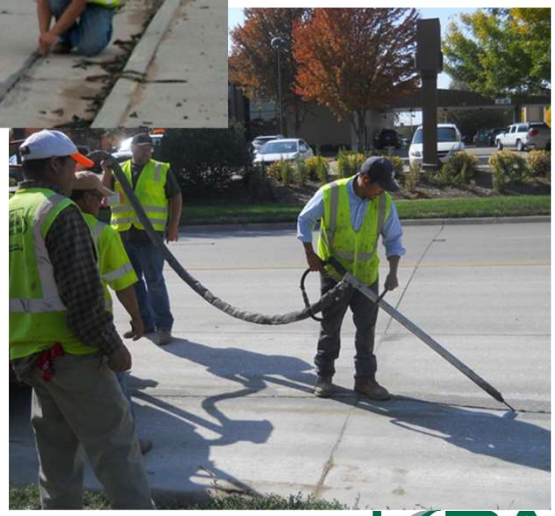
Cross-linked

Open Cell
(not recommended)

Bi-cellular

Joint Resealing: Installation

1. Removal of old sealant
2. Joint refacing
3. Joint reservoir cleaning
4. Backer rod installation
5. New sealant installation

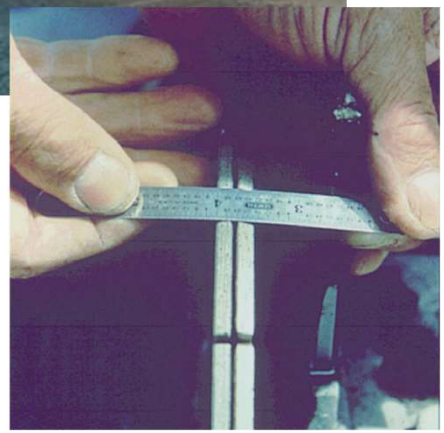


1. Removal of Old Sealant

Joint Plow

Joint Sawing

2. Joint Refacing



3. Joint Reservoir Cleaning

Media Blasting

3. Joint Reservoir Cleaning

Final Cleaning (Airblasting)

Preparation

- Ensure surface is moisture free
- Check air and pavement temperature
- Wipe test

Step 4: Check for Dirt/Dust on Walls

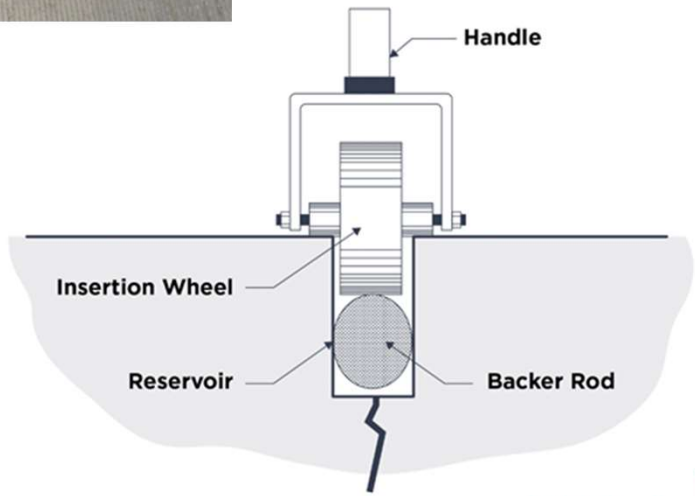
Step 4: Wipe Test with Moderate Contamination

Step 4: Conduct Wipe Test

Step 4: Wipe Test with Minimal Contamination

4. Backer Rod Installation

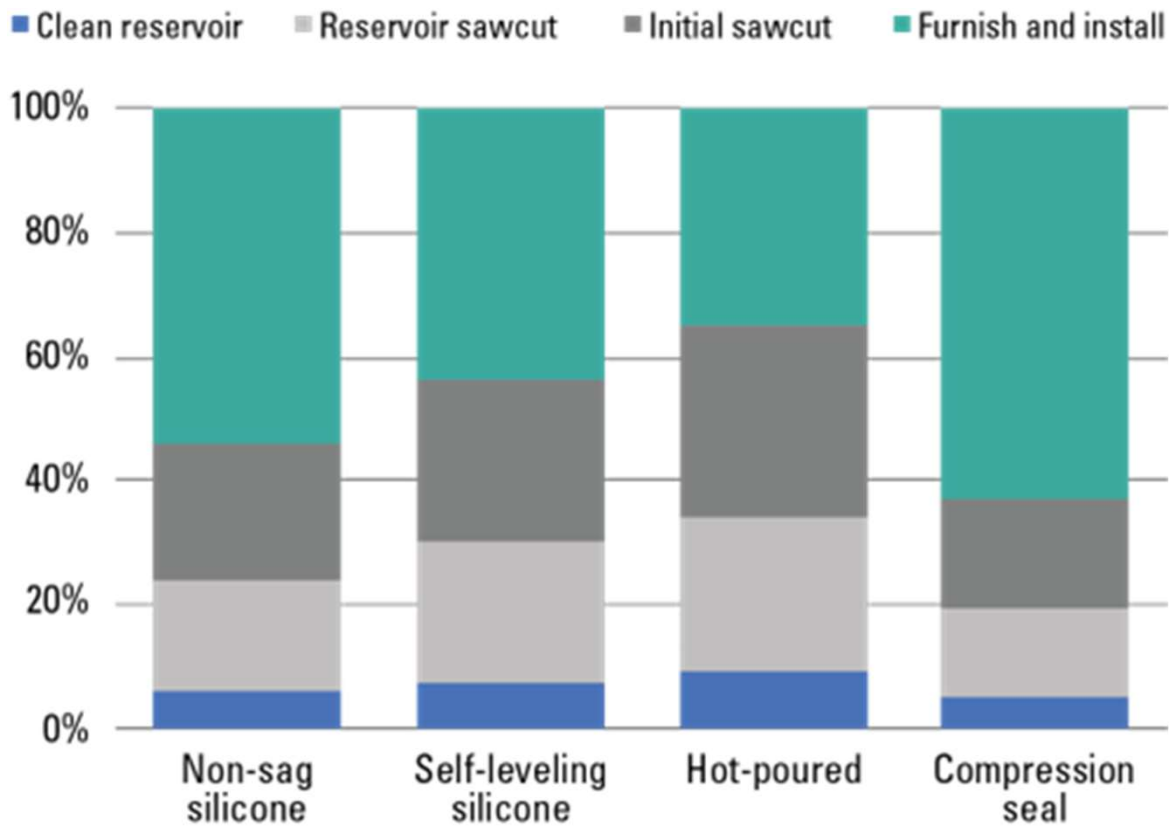
LIMITED USE! (wide joints only)



5. New Sealant Installation

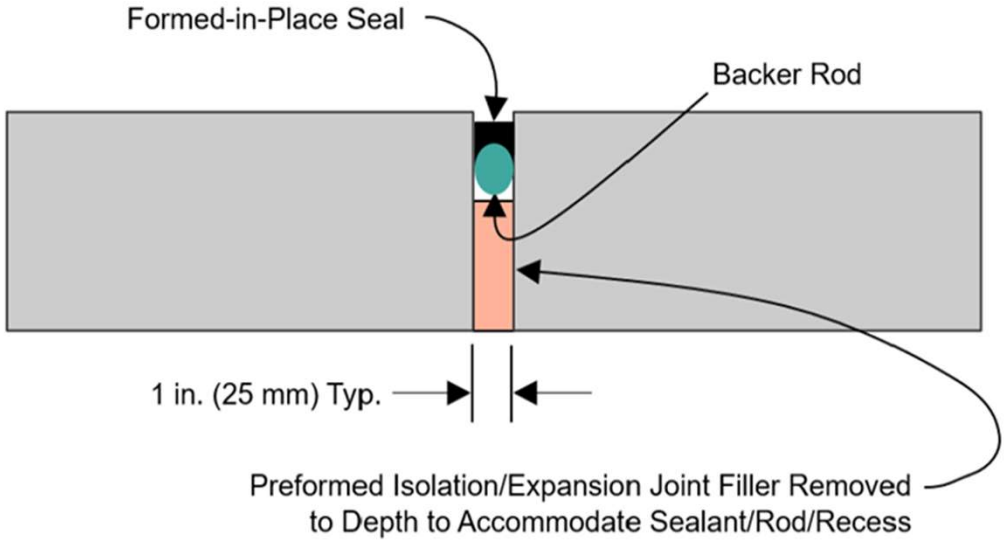
Sealant Installation: Hot-Poured

Relative Costs of Sealant Installation



Expansion Joint Resealing

- Special use joints to accommodate movements
- 1-2 inch wide with preformed filler and sealant “cap”
- Sealant extrudes or is extracted and requires periodic resealing
- Follow same general resealing steps



Joint Resealing: Key Factors for Success

- Selection of candidate projects
- Selection of proper material
- Proper reservoir design and joint shape factor
- Proper reservoir preparation
- Proper sealant application techniques
- Monitor opening to traffic

Troubleshooting

What is wrong here?

Troubleshooting

What might have happened here?

Troubleshooting

What is wrong here?

Troubleshooting

What is wrong here?

Guidelines for Sealing Cracks

- Leave tight, narrow cracks alone
- Seal working transverse cracks
- Can seal cracks ≤ 13 mm (0.5 in) wide
- Use special crack sawing blades
- Same general *joint* resealing procedures apply to *crack* sealing

Crack Sealing Procedures

1. Crack sawing
2. Cleaning
3. Sealant installation

Crack Sawing Equipment

Crack Chaser Blade

Sawed & Filled Crack

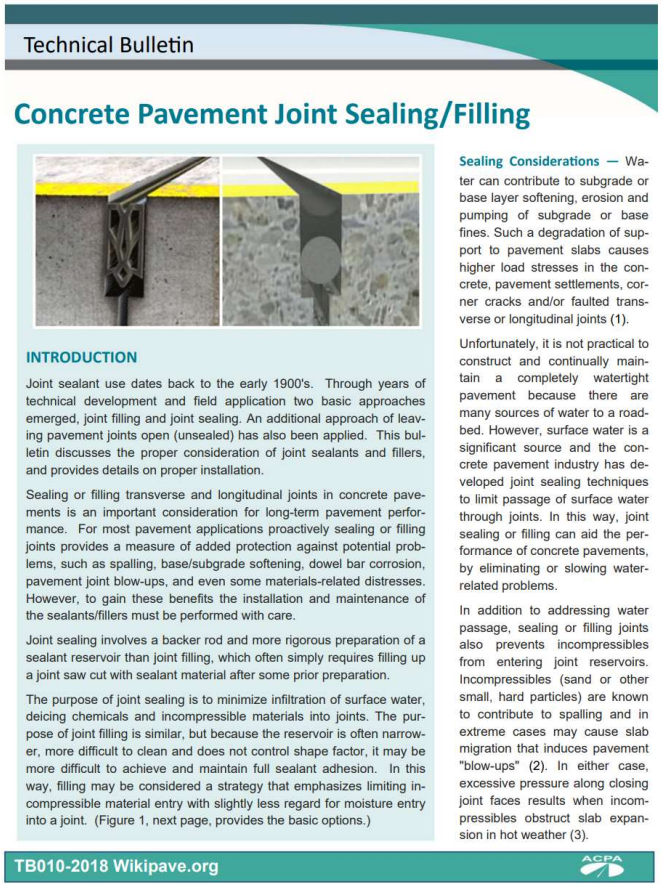
Completed Crack Seal

Resources

- http://wikipave.org/index.php/Joint_Sealing
- ACPA Tech Bulletin TB010-2018

https://www.igga.net/wp-content/uploads/2018/08/ACPA_Joint_Sealing_Tech_Bulletin_2018.pdf

- ACPA Wikipave Joint Sealing
- http://wikipave.org/index.php/Joint_Sealing



Technical Bulletin

Concrete Pavement Joint Sealing/Filling

INTRODUCTION

Joint sealant use dates back to the early 1900's. Through years of technical development and field application two basic approaches emerged, joint filling and joint sealing. An additional approach of leaving pavement joints open (unsealed) has also been applied. This bulletin discusses the proper consideration of joint sealants and fillers, and provides details on proper installation.

Sealing or filling transverse and longitudinal joints in concrete pavements is an important consideration for long-term pavement performance. For most pavement applications proactively sealing or filling joints provides a measure of added protection against potential problems, such as spalling, base/subgrade softening, dowel bar corrosion, pavement joint blow-ups, and even some materials-related distresses. However, to gain these benefits the installation and maintenance of the sealants/fillers must be performed with care.

Joint sealing involves a backer rod and more rigorous preparation of a sealant reservoir than joint filling, which often simply requires filling up a joint saw cut with sealant material after some prior preparation.

The purpose of joint sealing is to minimize infiltration of surface water, deicing chemicals and incompressible materials into joints. The purpose of joint filling is similar, but because the reservoir is often narrower, more difficult to clean and does not control shape factor, it may be more difficult to achieve and maintain full sealant adhesion. In this way, filling may be considered a strategy that emphasizes limiting incompressible material entry with slightly less regard for moisture entry into a joint. (Figure 1, next page, provides the basic options.)

Sealing Considerations — Water can contribute to subgrade or base layer softening, erosion and pumping of subgrade or base fines. Such a degradation of support to pavement slabs causes higher load stresses in the concrete, pavement settlements, corner cracks and/or faulted transverse or longitudinal joints (1).

Unfortunately, it is not practical to construct and continually maintain a completely watertight pavement because there are many sources of water to a roadbed. However, surface water is a significant source and the concrete pavement industry has developed joint sealing techniques to limit passage of surface water through joints. In this way, joint sealing or filling can aid the performance of concrete pavements, by eliminating or slowing water-related problems.

In addition to addressing water passage, sealing or filling joints also prevents incompressibles from entering joint reservoirs. Incompressibles (sand or other small, hard particles) are known to contribute to spalling and in extreme cases may cause slab migration that induces pavement "blow-ups" (2). In either case, excessive pressure along closing joint faces results when incompressibles obstruct slab expansion in hot weather (3).

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Penetrating Sealers

- Purpose
  - Reduce ingress of moisture & deicing chemicals
  - Silanes and siloxanes commonly used on pavements
- Application
  - Follow manufacturer's recommendations
  - Typically between 40-100 °F
  - Clean and dry
  - Angle nozzle to spray onto joint faces (one pass for each)
  - Apply to surface along joint (6-18 inches)

Questions?