

Concrete Pavement Joint Sealing

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Why?

- Why are we bringing this up?
 - Numerous Districts are experiencing premature concrete pavement joint seal failures
 - Hot-poured seals failing within a year or two



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Potential Causes

- There are a number of potential causes for premature failures
 - Reservoirs not properly cleaned
 - Seals not recessed
 - Ground and unground pavements
 - Reheated or overheated sealant materials
 - Specifications
 - Sealant type
 - Reservoir options
 - Lack of verification

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Reservoirs Not Properly Cleaned

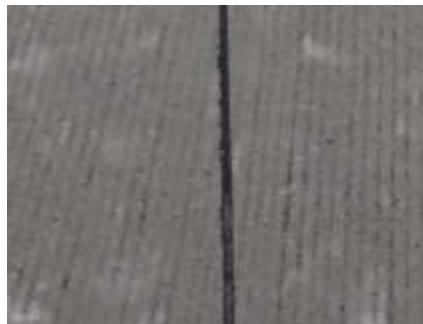
- Requirements:
 - Initial sawcut (1/8" width)
 - Immediately flush to remove slurry
 - Install backer rod
 - Second stage sawcut after 72 hours (3/8" width)
 - Pressurized water flush
 - Wire brush prior to sealing
 - Sand-blast the reservoir sidewalls
 - Air-blast the reservoir
 - Install backer rod

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Seals Not Recessed

- Requirements:
 - Top of sealant to be 1/8" to 1/4" below surface
 - To prevent tires and plows from disturbing seal
 - Issue with diamond-grinding of pavement



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Reheated/Overheated Sealant Material

- Requirements:
 - Heat to the manufacturer's recommended pouring temperature
 - Do not heat for more than 6 hours
 - Appendix of ASTM D6690 states overheating, reheating and heating too long can damage sealant properties

APPENDIX

(Nonmandatory Information)

X1. FIELD PRECAUTIONS

X1.1 Some if not all, materials conforming to this specification may be damaged by heating to too high a temperature, reheating, or by heating for too long a time. Care should be exercised to secure equipment for heating and application that is suitable for the purpose and approved by the manufacturer of the material. The material should be heated in a kettle or other

pressure air, and sealed by use of the melter-applicator described in X1.1.

X1.3 When material covered by this specification is used for maintenance or resealing of joints that have contained either similar or dissimilar sealing material, it is recommended that

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Specifications – Sealant Type

- Requirements:
 - Silicone, Type II Hot-pour or Neoprene
 - Only 1 or 2 states use silicone
 - Some states use Type II
 - Some states use Type IV (old Modified ASTM D3405)
 - Some states do not seal
 - Type II (old ASTM D3405)
 - Cheapest and used in PA
 - Not forgiving on cleanliness of sidewalls
 - Type I (old AASHTO M 173/ASTM D1190)
 - More expensive but was allowed in PA
 - PA had more stringent requirements
 - More forgiving on reservoir cleanliness

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Specifications – Reservoir Options

- Requirements:
 - RC-20M allows 4 options
 - 3/8" width for hot-pour and silicone
 - Square edge used to be beveled
 - Specimens tested @ 1/2" width

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WIDOT Unsealed Joints

- Wisconsin DOT Study on Joint Sealing
 - Concluded no benefit to sealing joints
 - 1/8" to 1/4" unsealed sawcuts

THE GREAT UNSEALING A Perspective on PCC Joint Sealing

By

Stephen F. Shober, P.E.; Wisconsin Department of Transportation

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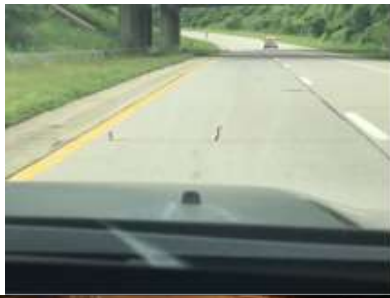
Specifications – Lack of Verification

- Requirements:
 - Sealant manufacturer sends QC Plan and sample to get listed in Bulletin 15
 - 7 PE samples in past 3+ years
 - Tested for penetration and softening point
 - Not bond, flow, resilience, tensile adhesion nor flexibility
 - No requirements for field verification samples
 - 2 IF samples in past 3+ years
 - Tested for bond after previously installed seals failed
 - No requirements to test reservoir cleanliness
 - ACPA recommends "wipe test"

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Where Do We Go From Here?



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