

**Pavement Preservation  
Checklist Series**

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# Crack Treatment



U.S. Department of Transportation  
**Federal Highway Administration**

# Crack Treatment Checklist

This checklist is one in a series created to guide State and local highway preservation/maintenance and inspection staff on the use of innovative pavement preservation techniques.

FHWA uses its partnerships with different pavement preservation organizations including American Association of State Highway and Transportation Officials, and State and local transportation agencies to promote pavement preservation.

To obtain other checklists or to find out more about pavement preservation, contact your local FHWA division office or check the following FHWA Web page:

[www.fhwa.dot.gov/pavement/preservation/resources.cfm](http://www.fhwa.dot.gov/pavement/preservation/resources.cfm)

Other valuable resources on pavement preservation:

- [www.roadresource.org](http://www.roadresource.org)
- [www.fp2.org](http://www.fp2.org)
- [www.tsp2pavement.pavementpreservation.org](http://www.tsp2pavement.pavementpreservation.org)

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# Preliminary Responsibilities

## Document Review

- Project specifications
- Traffic control plan
- Construction manual
- Agency application requirements
- Manufacturer's sealant installation instructions
- Sealant manufacturer's safety data sheets
- Applicable Occupational Safety and Health Administration (OSHA) safety requirements
- Melter manual

## Project Review

- Verify that the project is a good candidate for crack sealing or crack filling.
- Investigate the type of cracking present.
- Determine the frequency and severity of the cracking.
- Determine the frequency and severity of other pavement distresses.
- Review project for bid quantities.
- Determine whether the treatment is cost-effective.

## Materials Checks

- Sealants are selected based on required specifications, pavement condition, climate temperature extremes, and the effects of vehicular traffic.
- Sealant is from an approved source or listed on agency qualified products list (if required).
- Sealant has been sampled and tested prior to installation (if required).
- Sealant packaging, including meltable packaging, boxes, pails, or drums, is not pierced, dented, or damaged in ways that would prevent proper use. Sealant is stored properly.
- If backer rods are to be used, they are compatible with the sealant.

## Pre-Application Inspection Responsibilities

### Surface Preparation

- The surface is clean and dry.
- Other pavement distresses have been repaired.
- Any existing vegetation has been removed from cracks.
- Pavement temperature is correct.

## **Equipment Inspections**

### **Hot Applied Sealant Melters**

- For hot applied sealants, an indirectly heated double boiler type melter with effective mechanical agitation should be used.
- The melter is in good working order with all heating, agitation, pumping systems, valves, thermostats, and other parts functioning.
- The melter's heating system is thermostatically controlled within +/- 5°F.
- Temperature gauges are calibrated and checked for accuracy.
- Proper valving is used to control flow rate.
- Proper wand tips for desired application are used.

### **Other Application Equipment**

- Pump for cold applied sealant functions correctly.
- Pour pots are in good working order.
- Material squeegees or other shaping/forming tools are clean, in good condition, and of appropriate configuration to produce desired sealant shape.

## Crack Cutting/Cleaning Equipment

- A rotary impact router or random crack saw should be used to create the sealant reservoir. Ensure that this equipment is in good working order.
- The router or saw configuration is adjusted to the required reservoir width and depth.
- Router bits are in good condition, with no missing, chipped, rounded, or broken teeth.
- Air compressors have sufficient pressure and volume to clean cracks adequately and meet agency requirements. The air compressor must consistently provide 70 psi to 100 psi and a consistent blast flow of 70 cfm to 150 cfm.
- Air compressors are equipped with oil and moisture filters/traps that function properly.
- Vacuum cleaning system (if used) is functioning properly.
- Cutting and cleaning equipment has dust control devices to reduce the occupational exposure limits for silica emissions.
- Hot air blaster/heat lances (if used) are working properly.

## Weather Requirements

- Review of the manufacturer's installation instructions for requirements specific to sealant use is completed.
- Ambient and surface temperatures meet manufacturer and agency requirements (typically 40°F minimum and rising) for routing and sealing.
- Sealing does not proceed if rain is imminent.
- Application does not begin if there is any moisture on the surface or in the crack.
- Application should be avoided when dew may develop within the crack.

## Traffic Control

- Verify that traffic control conforms to plans and specifications and complies with the *Manual on Uniform Traffic Control Devices* (MUTCD).
- Verify that traffic control personnel are trained and qualified in accordance with contract documents and agency requirements.
- Report any unsafe conditions to a supervisor.
- Ensure that flaggers do not hold traffic for too long. Long work zones need two-way communication between flaggers.
- Ensure that traffic is not opened to the sealed pavement until the sealant has adequately cooled or cured to not pick up on vehicle tires.
- Remove or cover signs when they are no longer needed.

## Project Inspection Responsibilities

### Reservoir Cutting

- Routing or sawing should be performed on working cracks greater than 1/8 in. wide and generally spaced more than 20 ft apart.
- Router or saw operator should start at the centerline and move toward the shoulder.
- Routed or sawn reservoir is checked for correct configuration (width and depth).
- The asphalt concrete mixture is in sound enough condition to produce the required reservoir configuration without excessive spalling of the pavement during cutting.
- The cut reservoir is centered over the crack, and cutting of both sides of the crack to sound pavement has occurred.
- Determine if shoulders should be routed or sawn as well.
- Operator is wearing proper personal protective equipment.
- All safety mechanisms and guards on equipment are functioning properly.

## **Crack Cleaning (Air Blowing)**

- Cleaning operation is positioned just ahead of the sealing operation to guard against debris blowing into cleaned cracks or newly sealed cracks.
- Dirt and debris are blown from the crack and off the pavement surface. Dirt has not been blown from one crack to another that has already been cleaned. All dirt and debris are blown off the roadway in rural areas. Urban areas should use a vacuum cleaning system to remove dirt and debris from cracks.
- Check is conducted to verify that the crack has had all loosened dirt and debris removed by running a finger along the crack's sidewalls and examining for loose pavement, dust, and debris. If any dust is found, the crack is re-cleaned.
- Check is conducted for moisture in the crack and along the reservoir's sidewalls. If moisture is found, necessary steps are taken to remove the moisture.
- Proper personal protective equipment is worn by operator.

## Hot Air Blasting

- Hot air blasting is conducted immediately ahead of hot applied sealant installation to minimize condensation formation prior to sealing and to maintain warm temperature (5 minutes maximum time or 54 yards maximum distance).
- Heated surfaces are slightly darkened and warmed. EXTREME CAUTION IS USED not to burn the existing pavement surface.
- Proper personal protective equipment is worn by operator.

## Sealant Application

### Hot Applied Sealants

- Manufacturer's and agency's temperature installation requirements are being followed.
- Melter heat transfer medium is heated to the correct temperature range.
- Sealant is heated to a minimum of the manufacturer's recommended pouring or application temperature, but temperature does not exceed the material's maximum application temperature.
- Sealant is continuously agitated to assure uniformity, except when adding additional material.
- If melter is equipped with a heated hose system, the hose is heated to operating temperature prior to beginning sealant application.

- If melter does not have a heated hose, the hose is verified to be unplugged and clear prior to beginning application.
  - Sealant is recirculated through the hose to warm the hose prior to application. During idle periods, or if it is noted that sealant is cooling through the hose, sealant is recirculated through the hose back into the material vat to maintain hose temperature.
- Sealant temperature is checked periodically to assure proper temperatures.
- Melting vat is kept at least one-third full to help maintain temperature uniformity.
- Crack channel or reservoir is filled from the bottom up, to the specified level.
- Sealant material is formed/squeegeed/finished (if required) to the specified configuration.
- Sufficient material is applied to form the specified configuration, but not so much as to oversupply squeegee.
- Surface overband applications (if required) are within the specified thickness and width.
- Detackifier or other blotter is applied to reduce tack prior to opening to traffic, if needed.
- Any sealant overband is centered over the crack.
- Sealant is reapplied to low areas where sealant has settled or where too little material was applied.

- Adhesion is checked by using hands or a tool to firmly depress the sealant to determine if the cooled sealant can be debonded. Unbonded sealant is removed and crack is resealed.

### **Cold Applied Sealant**

- Manufacturer's installation instructions are followed.
- Sealant is applied using appropriate pumps or other application systems.
- Sealant is applied in the specified configuration.
- Sealant is allowed to cure for sufficient time to resist pick-up prior to opening to traffic.

### **Cleanup Responsibilities**

- Excessive sealant application or spills are removed.
- All loose debris from cleaning is removed from the pavement surface.
- Sealant containers and other miscellaneous debris are removed and disposed of properly.
- Melters and other application equipment are properly cleaned for the next use.

# Problems and Solutions

## (Problem: Solution)

### **Bubbles in Sealant:**

- The crack is wet—allow to air dry, or use a heat lance.
- Damaged backer rod—change backer rod installation method or rod diameter.
- Wrong backer rod—use proper backer rod for the sealant.

### **Sealant Not Adhering to the Crack:**

- Crack not clean enough—reclean crack.
- Wet cracks—allow to air dry, or use a heat lance.
- Low sealant application temperature—verify temperature gauges on melter and heat to correct temperature.
- Cold ambient temperature—allow temperature to rise, or use a heat lance.
- Poor sealant choice.

### **Sealant Cracking or Sealant Loss in Winter:**

- Sealant too stiff—use softer grade.
- Excessive pavement distresses.
- Poor cleaning during installation—improve cleaning.
- Reservoir size inadequate—use a widened reservoir configuration.

- Snowplows pulling out sealant—apply sealant flush with pavement.
- Sealant installed too deep in crack—use correct depth-to-width ratio.

### **Sealant Pickup When Opened to Traffic:**

- Opened to traffic too soon after application—delay opening.
- Cracks not clean and/or dry—reclean or dry.
- High ambient temperature—seal in cooler temperatures.
- Excessive sealant application—apply flush with surface.
- Sealant too soft for climate—use stiffer sealant.
- Use a detackifier or blotter to reduce initial tack.
- Overheated or underheated sealant—install at correct temperature; check temperature gauges on melter.
- Sealant contaminated with solvent or heat transfer oil from tank leak.

### **Sealant Gelling in the Melter:**

- Overheated sealant—check melter temperature gauges.
- Sealant reheated too many times—use fresh sealant.
- Use of sealant with short pot life—use sealant with longer pot life.

## **Creating Bumps When Constructing Asphalt Overlays; Sealant Adhering to Overlay and Shoving During Mix Compaction:**

- Excessive sealant applications on surface—use recessed or surface flushed sealant application or squeegee tight to the surface.
- Apply sealant at least one year prior to overlay.
- Apply detackifier or blotter to reduce sealant adhesion to overlay.
- Use of a pneumatic rubber tire roller as the breakdown roller—use of a dual-drive drum roller does not tend to shove the mix during compaction. Selection of roller type is especially critical for thin hot mix overlays.
- Use stiffer tack coat.

## **Web-Based Training**

*International Slurry Surfacing Association Web-Based Training.* Retrieved from [www.slurry.org](http://www.slurry.org).

## Sources

Information in this checklist is based on or refers to the following sources:

*Annual Book of ASTM Standards. Volume 04.03, Specification D3405 and D5078.* 2000. West Conshohocken, PA: American Society for Testing and Materials.

*Manual on Uniform Traffic Control Devices.* 2009, Revised May 2012. Washington, DC: Federal Highway Administration. Available at <http://mutcd.fhwa.dot.gov>.

*Materials and Procedures for Sealing and Filling Cracks in Asphalt Concrete Pavements, Manual of Practice,* Pub. No. FHWA-RD-99-147. 1999. Washington, DC: Federal Highway Administration.

*Thin-Surfaced Pavements, Synthesis of User Practices, NCHRP Synthesis 260.* 1998. Washington, DC: Transportation Research Board, National Cooperative Highway Research Program.

**For more information on the Pavement  
Preservation Checklist Series, contact:**

Construction Management Team, HICP-30  
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