The joint area is weaker under traffic, and susceptible to premature deterioration from water and air exposure. Joint Adhesive increases durability and service life of joints through improved bonding and sealing.

What is Joint Adhesive?
Pavement Joint Adhesive is a hot-applied modified asphalt composition used to adhere longitudinal cold construction joints in asphalt concrete pavements.
Joint Adhesive Material

- Joint Adhesive waterproofs the underlying area of low density asphalt.
- It provides adhesive bonding between the adjoining mats. Moisture, air and debris intrusion into the lower density asphalt are reduced.

Joint Adhesive provides improved resistance to thermal expansion and contraction.

What is a Paving Joint?

The interface between two Hot Mix Asphalt (HMA) overlays. A longitudinal paving joint occurs in asphalt pavement when a fresh batch of hot-mix asphalt is laid adjacent to an existing lane.

Joint adhesive application

Longitudinal paving joint

Types of Paving Joints

Based on the conditions under which the overlays are laid, the resulting longitudinal paving joint can be one of these types:

- **Cold Joints**
  - Cold joints are the most common type of a paving joint because most construction is completed one lane at a time. Cooled to below 120°F.

- **Semi-Hot Joints**
  - A semi-hot joint is commonly produced on HMA paving projects. Cooled to 120-140°F.

- **Hot Joints**
  - Hot joints (or Echelon paving) require simultaneous paving of multiple lanes, which is rare because of today's constrained work zones, especially highways.

Cold and Semi-Hot joints are prime candidates for Joint Adhesive
Low Density Zone

Low density occurs when the first lane is paved and the edge is unconfined. This leads to a lower density after compaction.

This area is weaker under traffic and permits intrusion of water and air, which causes premature deterioration of the joint (sometimes within 1-2 years).

Causes of Joint Deterioration

Causes:
- Thermal movement (freeze/thaw cycle)
- Increased oxidation
- Infiltration of water and debris

Effects:
- Significantly shortened joint life
- Crack formation, widening, and raveling
- Brittle pavement
- Weaker pavement and sub-base deterioration

Performance Studies
Performance Studies

There is a wealth of Longitudinal Joint performance information available:

- New Jersey Department of Transportation recommends the use of Joint Adhesive and has published revisions to their standard specifications pertaining to longitudinal joints on HMA pavements. Revisions include the use of Polymerized Joint Adhesive.
- Federal Highway Administration/NY Evaluation of eight longitudinal joint construction techniques for asphalt pavements in Pennsylvania

Performance Studies

Most Important, NCAT Study, National Center for Asphalt Technology

- NCAT studies took place over a six-year period (Sept. 1995 – July 2001) and were performed in 5 states:
  - Pennsylvania, Colorado, Michigan, Wisconsin, and New Jersey
  - Additional Test Sections: Georgia, Iowa, Arizona, Minnesota, Ohio, Kentucky, Indiana, Illinois

- NCAT tests confirmed that untreated longitudinal paving joints in asphalt pavement, would encounter cracking, raveling, and eventually fail due to water infiltration, thermal movement, and low density.

Techniques Studied

- 12/1 wedge - Hot side rolling
- 3/1 wedge - Cold side rolling
- Cutting wheel - Edge resistant
- Joint maker - Joint adhesive
Performance Studies Results

NCAT Conclusions and Recommendations:
- Longitudinal joint constructed using rubberized (joint adhesive) material gave the best performance with no significant cracking.
- NCAT recommendation: Use rubberized joint material (Crafco PJA 34524 or equal).

SOLUTION
Use of pavement joint adhesive will reduce longitudinal paving joint crack formation and deterioration.

Sealing the bituminous shoulders of concrete pavement is shown to reduce the total volume of water entering the pavement system by as much as 85% for a given rain event. Sealing the longitudinal edge joint on concrete pavements should be considered as a pavement preventative maintenance treatment”.

Minnesota Transportation Board research report
Specification Approvals

Joint adhesive is now accepted and specified in **OVER 20** states.

Specified on every NJ DOT paving project:
- Ohio Turnpike – 1998
- Michigan – 2001
- New Jersey – 1998
- Minnesota – 2002
- Indiana – 2002
- New York – 2011 (thruways)
& 2016 (all paving projects)

Jefferson County Fall 2018

Joint Adhesive Installation
Installation Overview

- Preparation (material and equipment)
- Preparation (clean and dry)
- Joint adhesive application
- Tack coat
- Place and compact mat

Equipment

- Oil jacketed double boiler melters
- Same equipment used for crack sealing

Application Temperature

The product application temperature should be a minimum of 380°F (193°C) and a maximum of 400°F (204°C). We recommend applying the product toward the higher side of this range to increase adhesion and flow/workability of product.
Joint Adhesive Shoes

Ensure the pavement temperature is a minimum of 40°F (5°C) during application. A hot air lance can be used to raise pavement temperature.

Pavement Temperature

Clean & Dry

Prior to the application of the joint adhesive, ensure the face of the joint is thoroughly dry and free from any loose material, dust, or any other debris. If necessary, clean the joint face with compressed air.
Application

Pump the adhesive from the melter, through the wand onto the vertical face of the joint.

Use an applicator shoe attached to the end of the wand that levels the adhesive to the appropriate thickness (1/8”).

Application

Apply the adhesive in a continuous, 1/8 in. (3 mm) thick band over the entire face of the longitudinal joint.

Do not exceed an overlap of more than 2 inches (50mm) at the bottom of the joint, or more than 1/8 inches (13 mm) at the top of the joint.

Ex: 12” notched wedge joint

Application Video
Tack and Pave

Following application of the joint adhesive pavers will apply the tack coat then place the adjacent asphalt mat.

Roll and Compact

Benefits of Joint Adhesive
- Best technique – significantly improves joint performance and pavement life
- Seals against water, air and debris
- Gives the joint area flexibility to withstand traffic loads and temperature fluctuations
- Delays future maintenance, related traffic delays and safety issues
- Proven, dependable, and easy application
- Saves taxpayer money over the life of the road