
SAVING OUR ROADS

Crack Sealing Basics for Roads and Streets

Using Hot Rubberized
Asphalt Crack Sealants



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Crack Sealing is an Integral Component of an Effective Pavement Preservation Program



CrackPro Melter/Applicator



CrackMaster Crack Sealants

“Pavement Preservation” is a cost-effective set of practices that extend pavement life and improve safety and motorist satisfaction while saving public tax dollars.

Crack sealing is designed to extend the life of existing pavements by eliminating or reducing the entrance of water into the pavement structure through the upper surface. By stopping the entrance of water, the rate of deterioration of the road is significantly slowed. Crack sealing also prevents the loss of aggregate from the edges of the crack.

Moisture Intrusion into Cracks is One of the Leading Causes of Pavement Deterioration

Pavement deterioration occurs when melted snow or rainwater seep through cracks in the pavement and can't get absorbed into the frozen ground. When the water freezes, it expands and can "pop" or weaken the asphalt. The weight of autos rolling over the weakened pavement causes chunks to break away.

- 1** Rainwater seeps into small cracks in the asphalt and puddles between the asphalt layer and the roadbed.

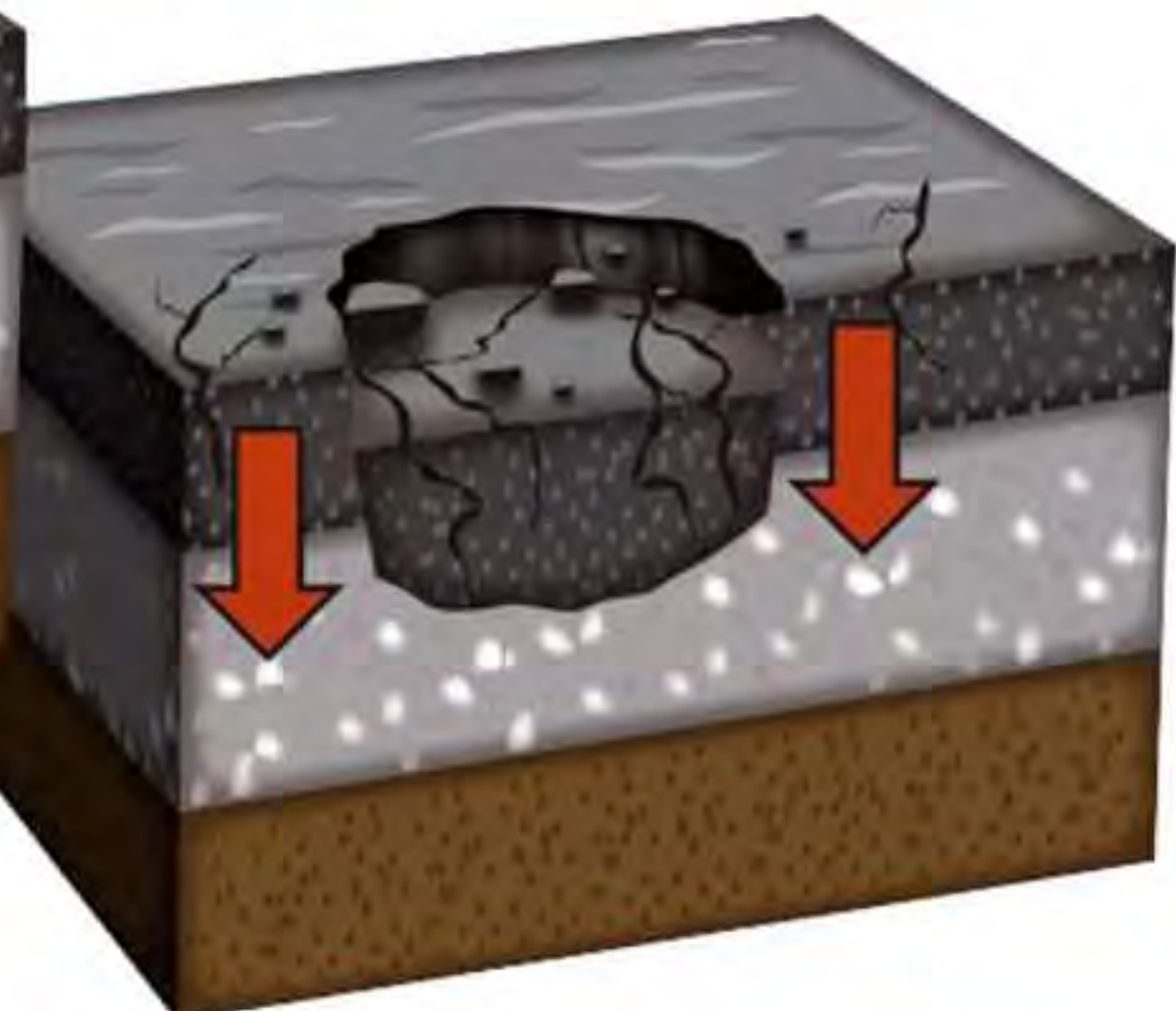


- 2** Low temperatures freeze the water, forcing the asphalt upwards.

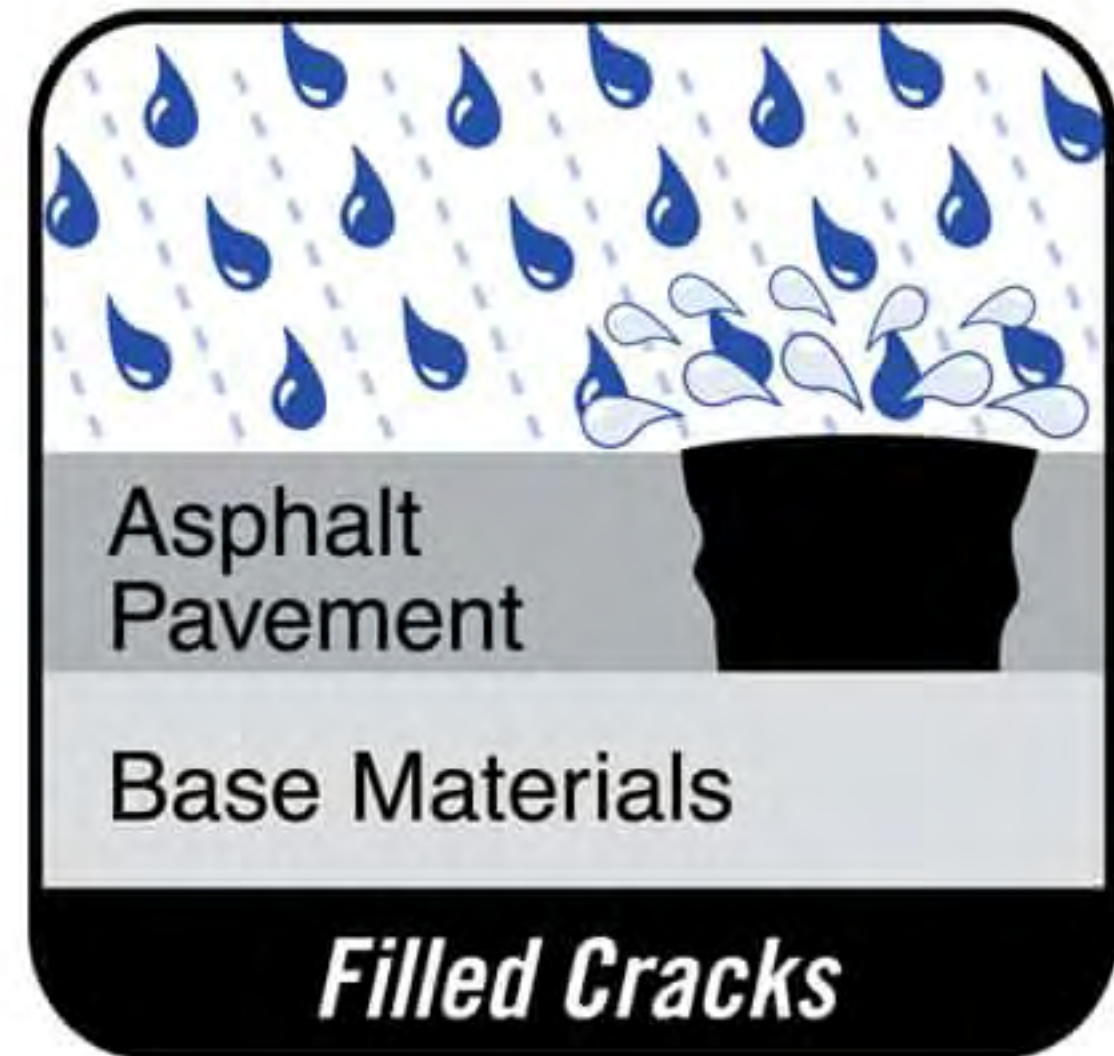


- 3** Once the ice thaws, the water is absorbed into the weakened roadbed and leaves behind a cavity. Vehicle traffic breaks the surface apart and pushes it down into the weakened roadbed.

- 4** Larger cracks and potholes are formed when the crumbling asphalt fills the cavity.



Crack Filling Prevents Moisture Intrusion Into Pavement Cracks by Providing a Water-Proof Barrier



Types of Cracks in Asphalt Roads

Cracks in pavement appear in various sizes, lengths and configurations depending upon the underlying cause.

TRANSVERSE CRACKS

Cracks perpendicular to the center line of the road.

Possible Causes:

- Shrinkage of pavement due to low temperatures or aging of asphalt binder.
- Reflective crack caused by cracks underneath
- Top down cracking due to traffic loads



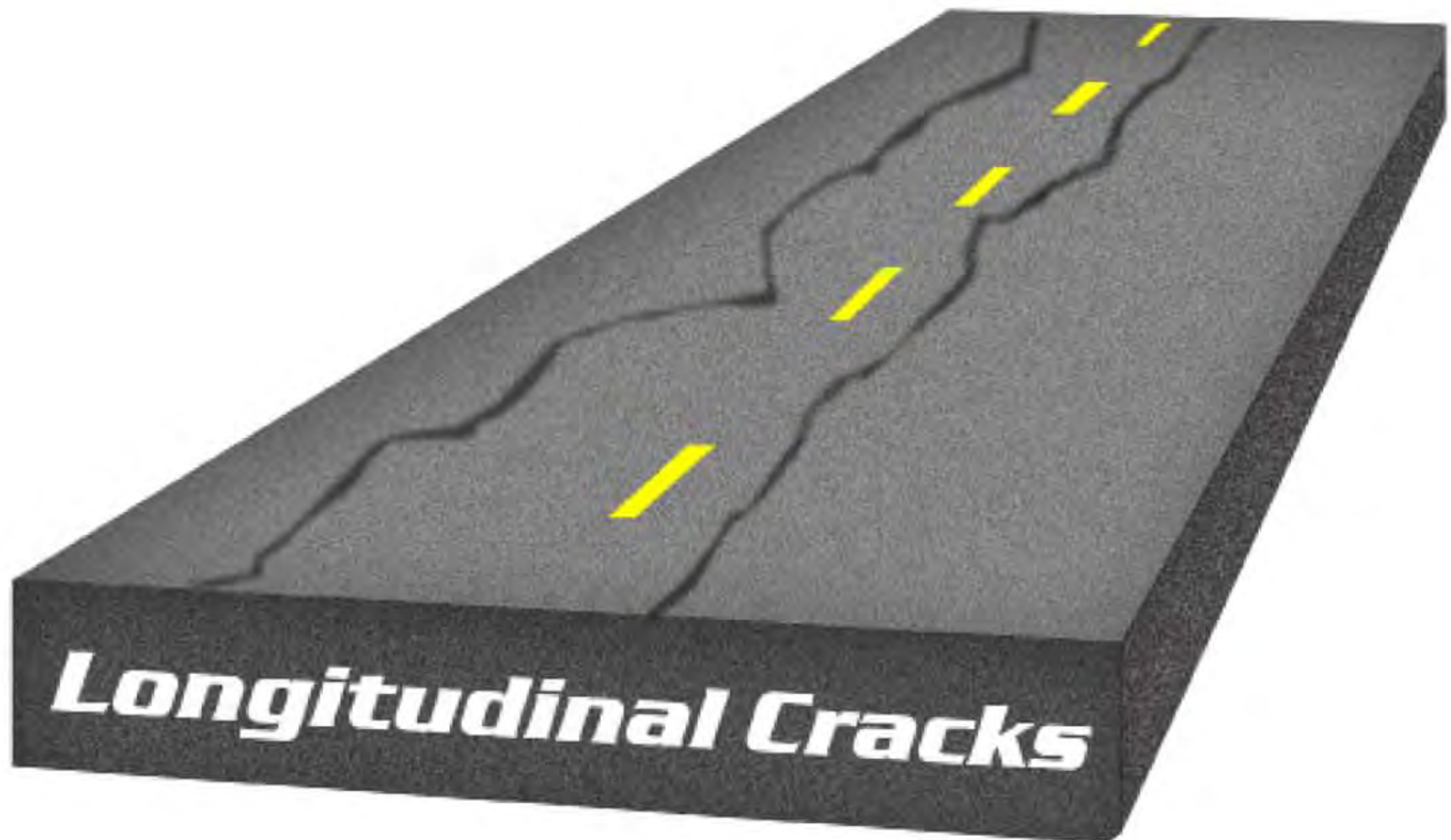
Types of Cracks in Asphalt Roads

LONGITUDINAL CRACKS

Cracks parallel to the pavement's center line or lay down direction

Possible Causes:

- Poor paving joint construction
- A reflective crack from underlying layers
- Top down cracking due to traffic loads



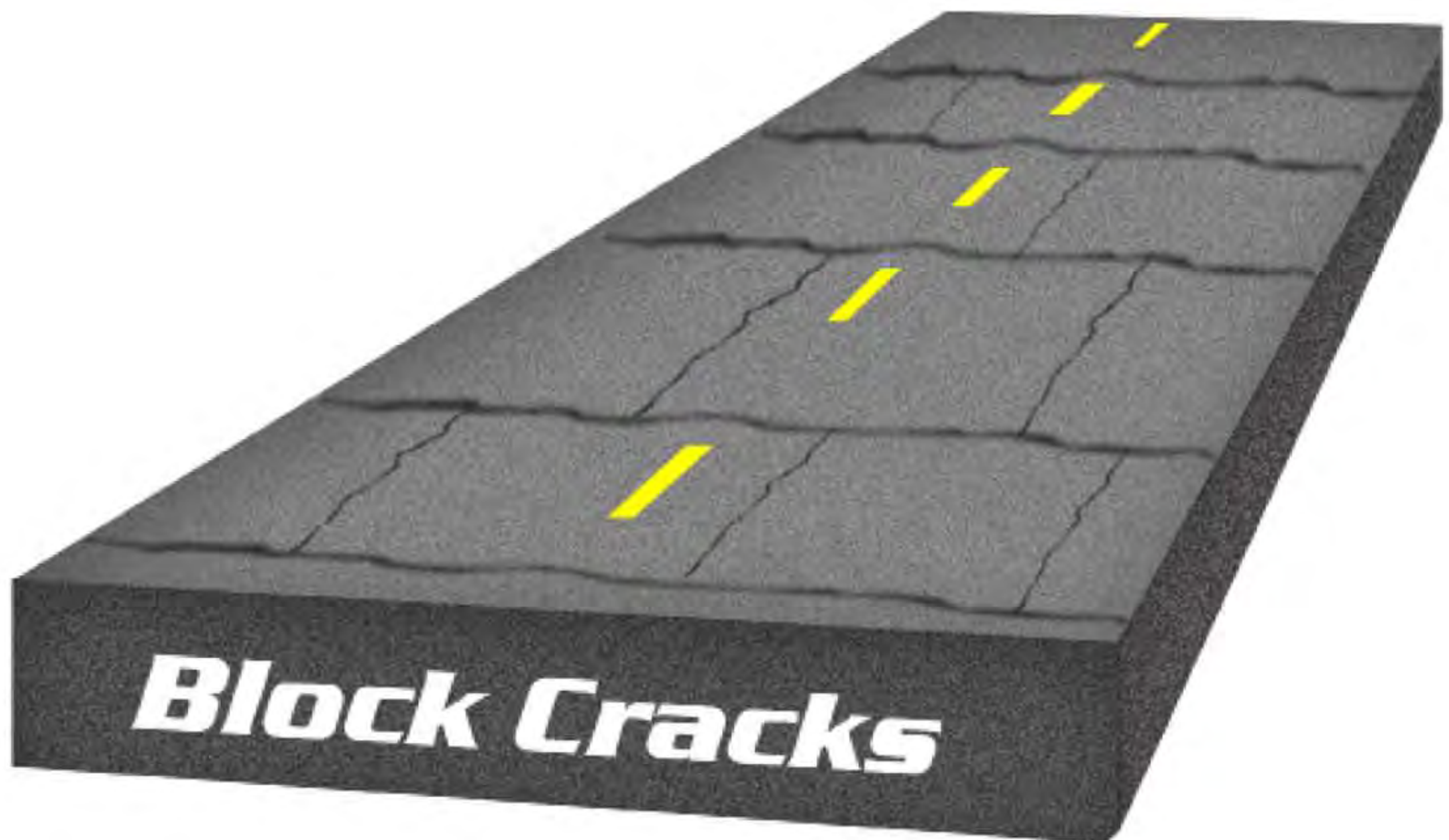
Types of Cracks in Asphalt Roads

BLOCK CRACKING

Interconnected cracks that divide the pavement up into rectangular pieces.

Possible Causes:

- Inability of asphalt binder to expand and contract with temperature cycles
- Aging and hardening of asphalt binder
- Poor choice of asphalt binder in the mix design

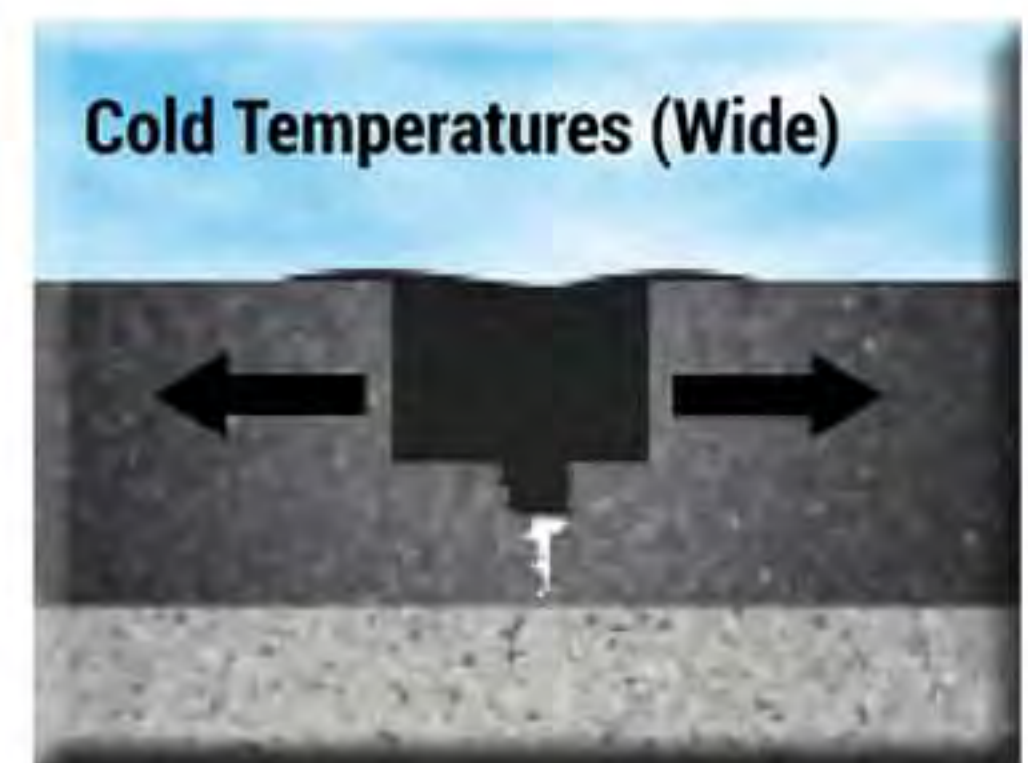


What is Hot Rubberized Asphalt Crack Sealant?

Hot rubberized crack sealant is a blend of asphalt and polymers that is heated to approximately 400°F in specialized oil-jacketed melting kettles. The molten rubberized asphalt liquid is then applied into cracks in asphalt pavement, providing a moisture proof resilient barrier as the material cools. The material is supplied in 25 to 30 lb. solid blocks that are added to melters and heated.



Hot Rubberized Asphalt Crack Sealants exhibit outstanding resilience, flexibility, durability and adhesive qualities – making it the ideal crack sealant for asphalt pavements.



Crack Preparation Techniques for Hot Rubberized Asphalt Crack Sealants

There are several alternative crack preparation and cleaning methods that are widely used today. Each method offers advantages and disadvantages. The most important thing to remember is that cracks must be **CLEAN** and **DRY** prior to filling with hot rubberized asphalt crack sealants.

ROUTING CRACKS



Crack Routing is done to deepen and widen cracks in asphalt pavement to provide a consistent reservoir for hot rubberized crack sealants. A mechanical crack router with rotating drum bits is used to rout the cracks.

ADVANTAGES of ROUTING

- Opens small cracks to allow crack sealant to flow into and fill
- Provides uniform edges on crack walls for better adhesion
- Allows cracks to be filled at or below pavement surface level to avoid snow plow damage

DISADVANTAGES of ROUTING

- Extremely labor intensive and expensive
- Difficult to follow random and meandering cracks with router
- May cause damage to older, oxidized pavement
- Slow process exposes workers to traffic for longer periods of time

Crack Preparation Techniques for Hot Rubberized Asphalt Crack Sealants Cont.'

Routed Cracks must be blown out and cleaned with either compressed air or heated compressed air prior to filling with sealant.



The Ontario Ministry of Transportation has done extensive studies of routing techniques and have determined that a 4 x 1 (width x depth) aspect ratio is the optimum rout or reservoir for crack sealing. It produces less stress on the material by spreading the load over a wider area, allows for better bonding due to larger surface area, makes it easier for router to follow cracks, and produces less stress on routers and bits.



4x1 Aspect Ratio (Unfilled)



4x1 Aspect Ratio (Filled)

Crack Preparation Techniques Cont.'

CLEANING CRACKS WITH A HOT COMPRESSED AIR LANCE

This method combines a propane-fired wand with compressed air to blow out, clean and remove moisture from cracks. This is particularly important in early spring and late fall when temperatures are cool and moisture is prevalent in cracks.



ADVANTAGES of HOT COMPRESSED AIR LANCE

- Fast and cost effective
- workers are exposed to traffic for shorter times than routing
- cleans and removes moisture for better adhesion of sealant
- The heat slightly melts the old asphalt in the crack and allows for better adhesion
- It does not weaken old, oxidized pavement as routing does

DISADVANTAGES of COMPRESSED AIR LANCE

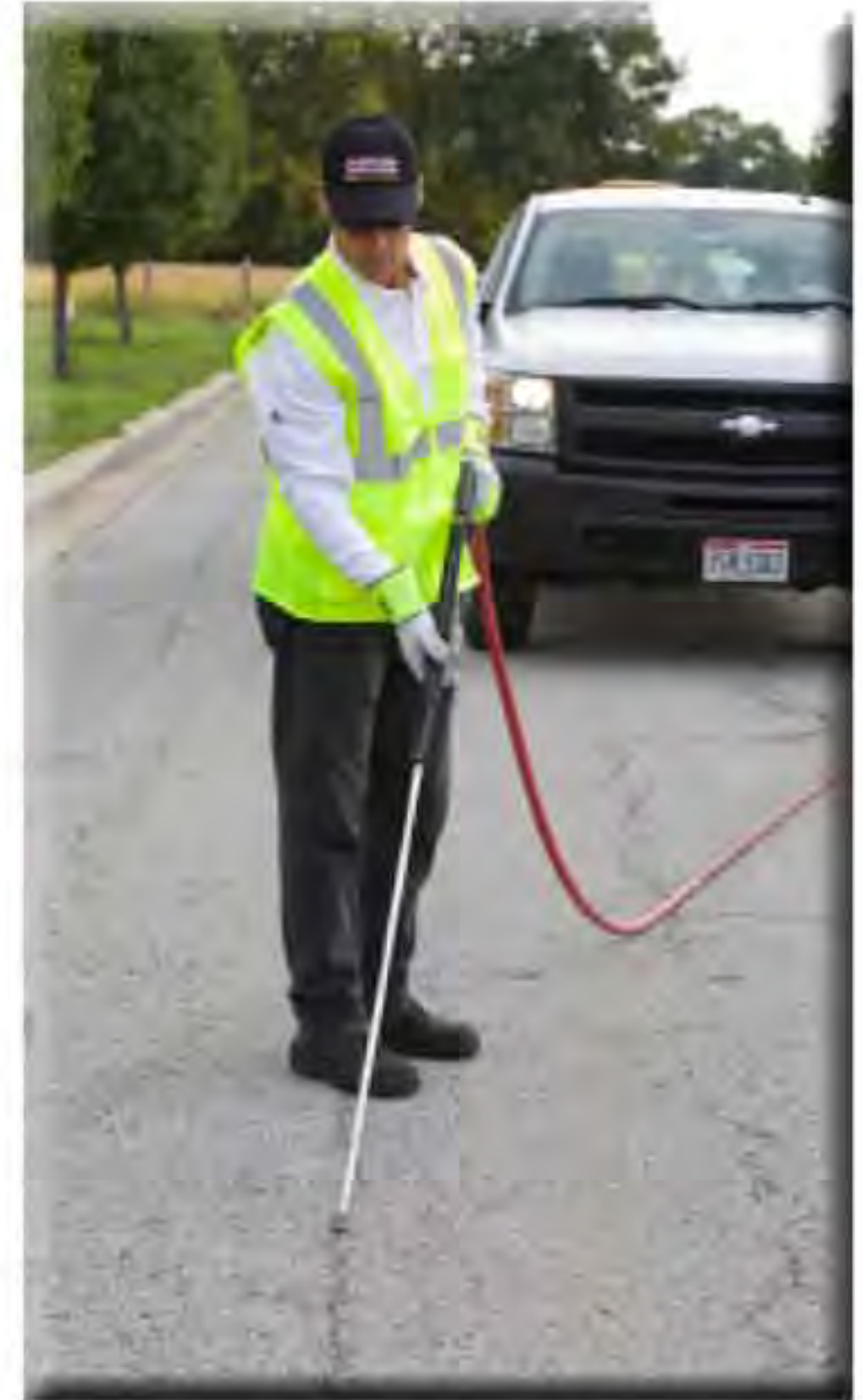
- Caution must be exercised due to extremely high temperature at tip (up to 1,000° F)
- Care must be taken not to burn existing asphalt
 - Does not widen small cracks as routing does

The Compressed Air Heat Lance is highly recommended when sealing cracks in the early spring or late fall when temperatures are below 45°F. Even if moisture is not visually evident, the heat of the material could draw moisture that is present within the pavement. A hot air lance could alleviate any adhesion problems that arise due to moisture in the pavement.

Crack Preparation Techniques Cont.'

CLEANING CRACKS WITH COMPRESSED AIR

This method utilizes high pressure compressed air to "blow out" and clean cracks just prior to filling.



ADVANTAGES of COMPRESSED AIR

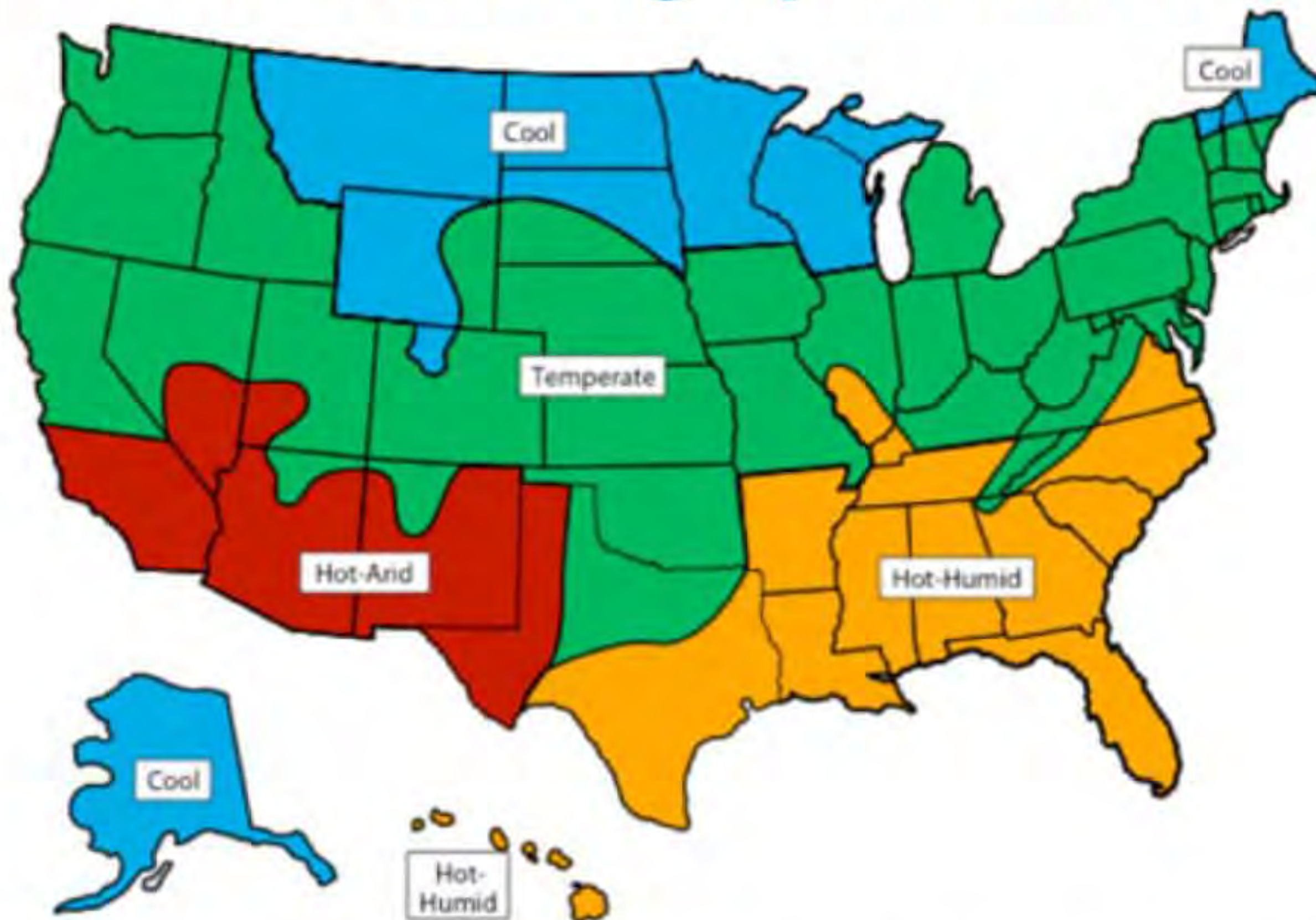
- Fast and cost-effective
- Removes the majority of dirt and debris from cracks
- Can easily follow meandering and random cracks

DISADVANTAGES of COMPRESSED AIR

- Does not widen small cracks as routing does
- Does not thoroughly dry cracks that have water or ice in them
- On small cracks, air alone will not remove vegetation

Using compressed air alone to clean cracks prior to sealing is known as the "Blow and Go" method. The "Blow and Go" method has gained significant popularity due to cost, efficiency and the fact that it produces satisfactory results. The "Blow and Go" method is ideally suited for crack sealing during warmer temperatures.

Selecting the Right Crack Sealant for a Particular Geographic Climate



Selecting the right crack filler is critically important to the success of a crack filling project. Regardless of the cost of the sealant, it is still the least expensive component of the job. Labor and equipment are the larger costs of a crack sealing project. To skimp on the quality of crack sealant would be penny wise and pound foolish. Hot Rubberized Asphalt Crack Sealants are specially formulated for optimum performance in varying climatic conditions. States with extremely cold temperatures require crack sealants formulated for low temperature ductility and flexibility. States with warmer temperatures require sealants that resist flow in hot weather.

CrackMaster provides sealants that meet the requirements of all types of geographic areas.

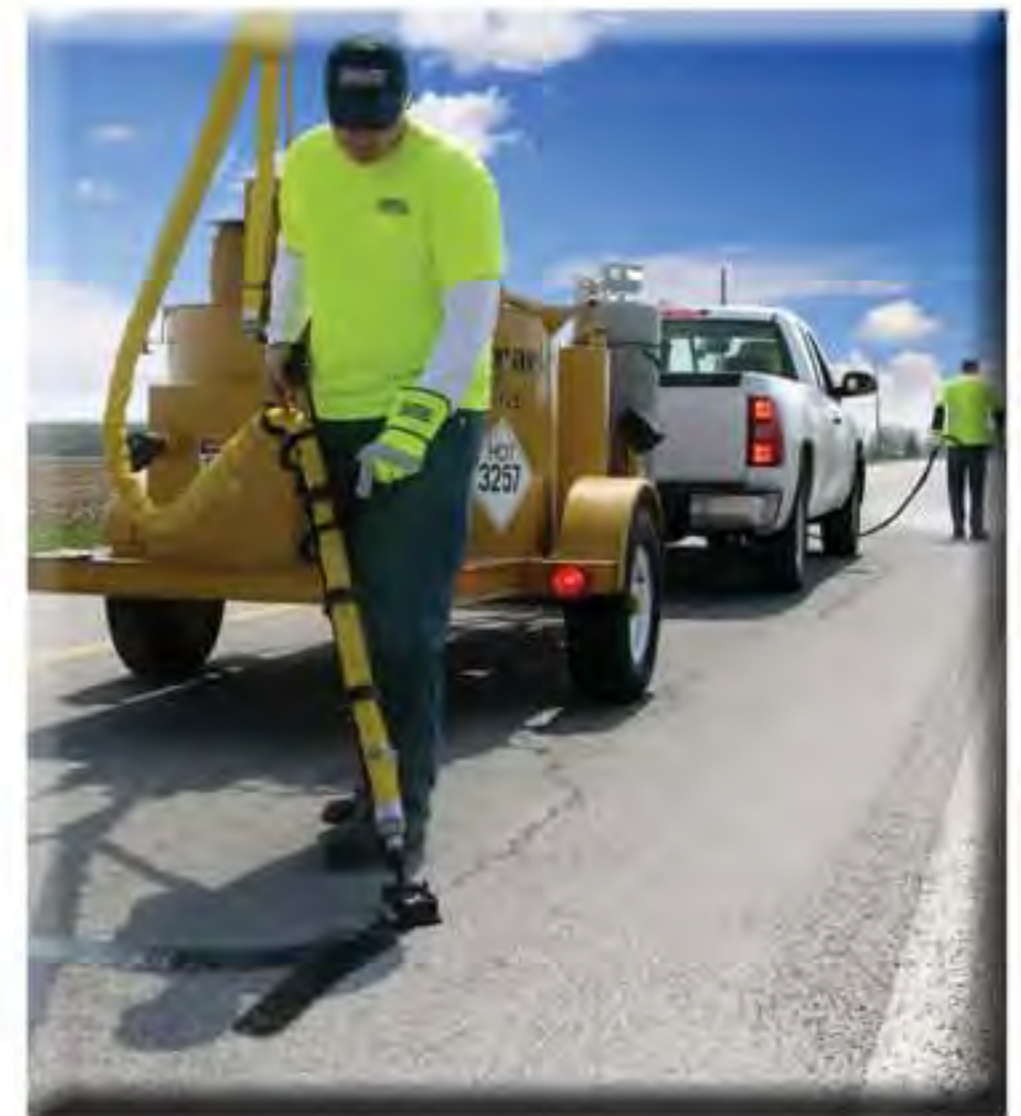


Recommended Equipment for Heating and Applying Hot Rubberized Asphalt Crack Sealants

OIL-JACKETED MELTING EQUIPMENT

Specially designed oil-jacketed melters are highly recommended for heating and melting hot rubberized asphalt crack sealants. The oil-jacket acts as a "double boiler" to prevent the crack sealant from overheating and "cooking" the polymer. It's important that the material remain at a consistent temperature of approximately 390°- 400°F during application. Oil-jacketed Melters are supplied both with and without pump and wand applicator systems.

Oil-Jacketed Melter/Applicator with Pump and Heated Hose and Wand Applicator



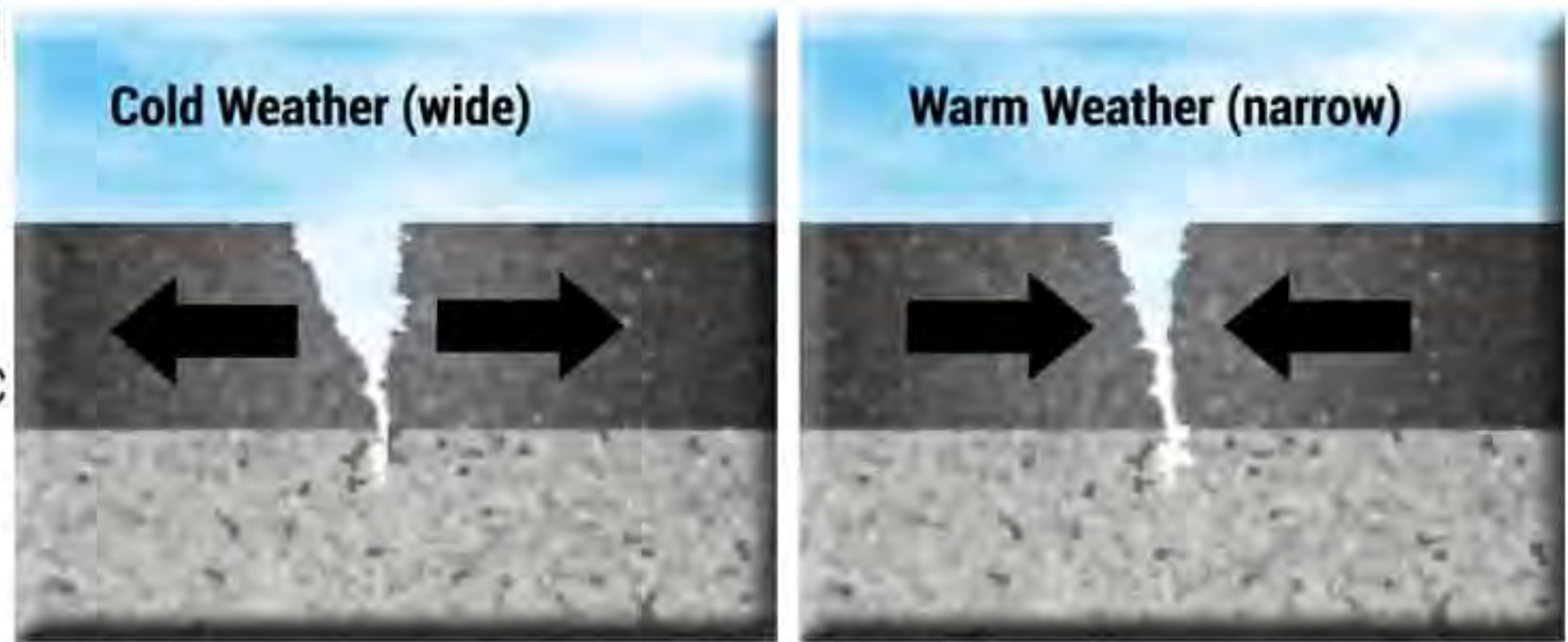
Oil-Jacketed Gravity Flow Melter



Applicator Unit for Use with Gravity Flow Melters

Applying Hot Rubberized Asphalt Crack Sealants

Ideally, hot rubberized crack sealants should be applied when the air temperature is between 45° and 65°F in geographic areas that are subject to cold winters. Cracks open up wider at cooler

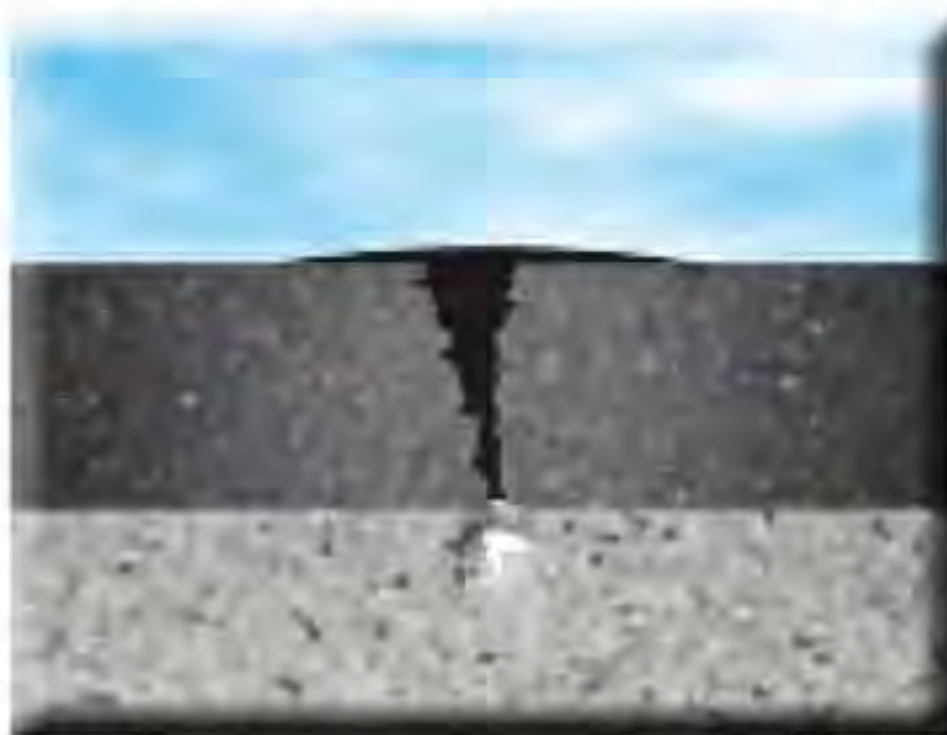


temperatures and contract or become narrower in warmer temperatures. It is advantageous to apply crack sealant when cracks are opened wider. However, in warmer southern climates, this becomes less important as cracks tend to not move or open up as much.

The crack sealant should be applied leaving a thin over-band of material on each side of the crack. Thick over-bands and material ridges should be avoided to avert snow plow damage in colder climates.



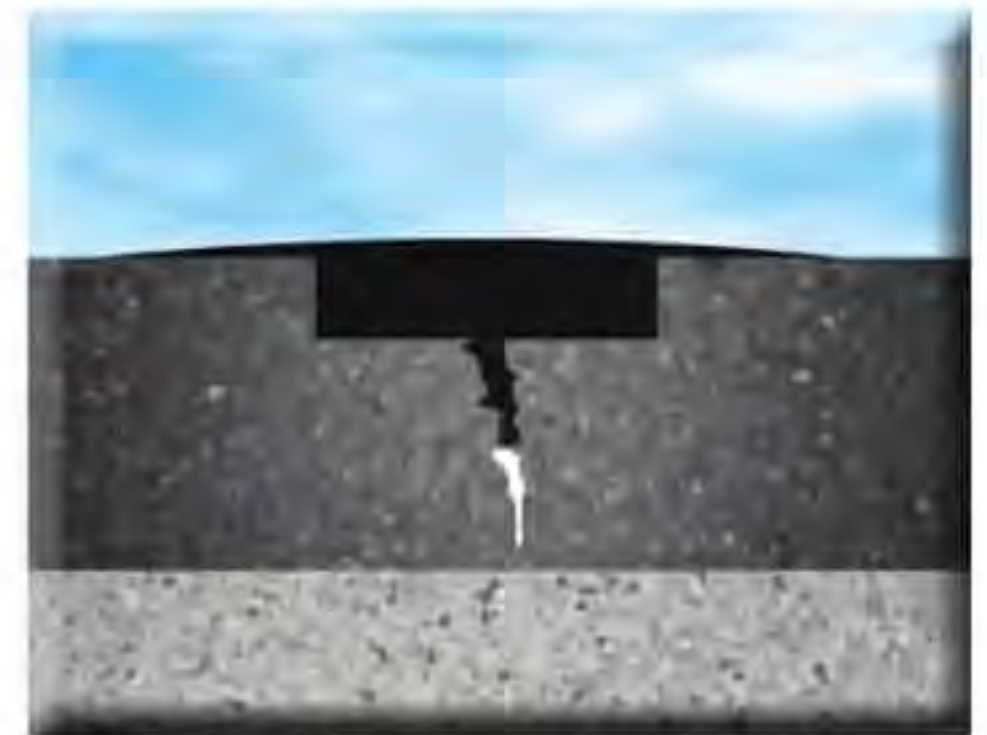
Popular Crack Filling Methods



1. Non-Routed Crack



2. Standard Routed Crack



3. Shallow Routed Crack

In summary, use the best sealant, clean and dry the cracks, don't overheat the material and don't excessively over-fill the cracks.