

## DuraTherm Substrate Guide

The following information is intended to assist the reader in evaluating existing asphalt pavements for DuraTherm installation and to provide important tips on successful removal and replacement best practice.



# Evaluating an Existing Substrate for DuraTherm

Key to successful DuraTherm is a high quality asphalt substrate. In many cases, existing pavements are suitable dependent on Pavement Defects and Surface Contamination.

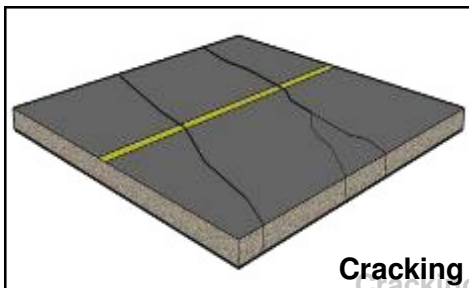
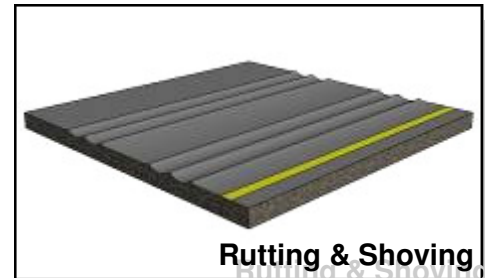
## Pavement Defects

The best way to evaluate if pavement is suitable for DuraTherm is by condition. If a pavement is not suitable it will be showing signs of visible degradation due to age or poor construction. Pavements over 5 years should not be considered for DuraTherm.

### DO NOT INSTALL DURATHERM ON PAVEMENTS SHOWING THE FOLLOWING VISIBLE DEFECTS

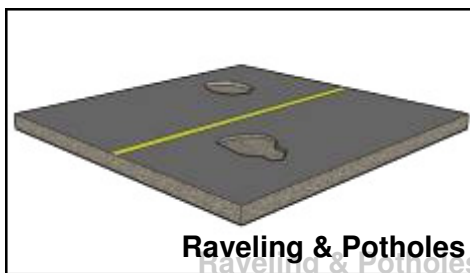
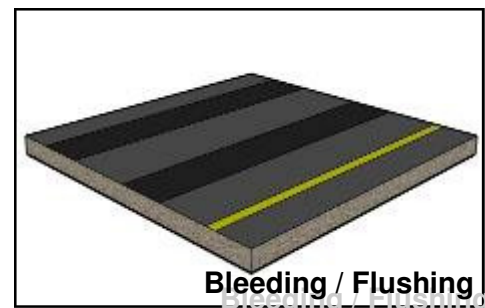
Rutting—a depression of the pavement in the wheel path. It is a structural failure due to excessive loading of that pavement

Shoving—localized ripples in the asphalt surface sometimes referred to as “corrugations” or “washboarding”. It is a sign of an unstable asphalt experiencing plastic flow.



Cracking—shrinkage of subgrade or asphalt, or excessive bending of the pavement surface under load.

Bleeding / Flushing—Through the action of vehicle tires, heat and migration of excessive asphalt cement to the surface. Surface texture becomes filled with liquid AC. May indicate an over asphalted, unstable mix.



Raveling—Loss of aggregate from the surface as a result of an “abrading” action of vehicle tires. It will appear as a rough texture on the pavement surface as aggregate pops out.

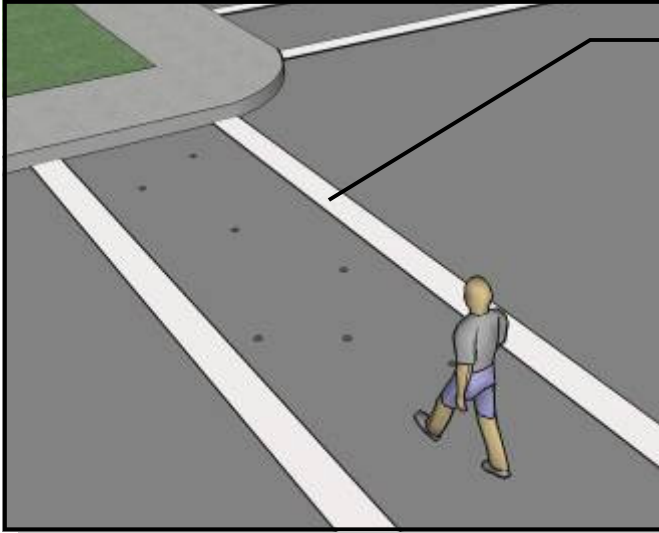
Potholes—Severe pavement fatigue cracking which results in a total loss of asphalt in a localized area, creating a hole in the road.

The above examples are the most common examples of defects that would result in an existing pavement to be deemed unsuitable. However there may be from time to time other issues that are not listed above.

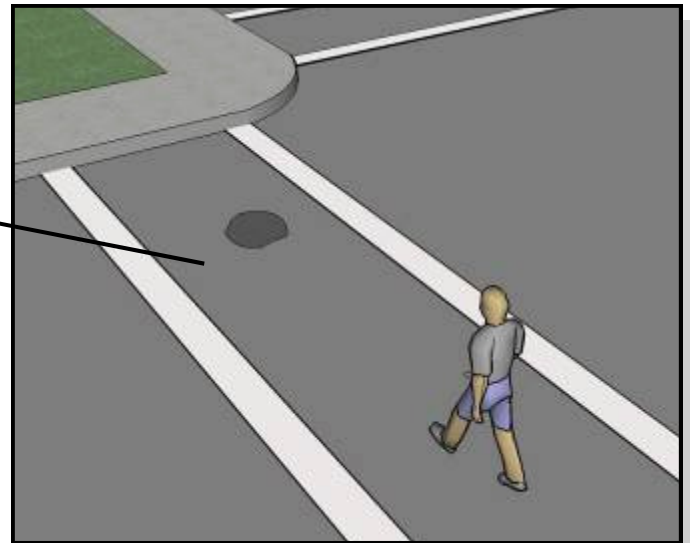
Always inspect every site in advance and use a good measure of common sense.

# Surface Contamination

For DuraTherm to have a pleasing appearance and adhere well to the pavement it must be substantially free from surface contamination such as excessive oil spills or heavy line markings. Always inspect the site for surface contamination well in advance of installation so proper steps can be taken.



Minor amounts of oil droplets (up to 10 small spots less than 2 inches in diameter per 300 sq ft) are acceptable and should be evaporated away during the heating process. If small spots are more frequent power washing should be considered.



If larger areas are contaminated by oil, then they must be removed by power washing. If the oil is soaked in and cannot be washed away then the pavement must be removed and replaced.



If line markings such as ladder stripes are present it is most likely that the pavement will have to be removed and replaced. These heavy markings cannot be removed from the surface without leaving unsightly marks (ghost lines).



One may consider applying DuraTherm over very faint markings.

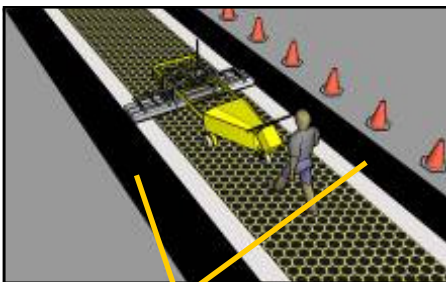
# Removal and Replacement - Best Practices

When existing pavements are deemed not suitable for DuraTherm they must be removed with a milling machine and replaced with new pavement. (the “mill and fill” process)

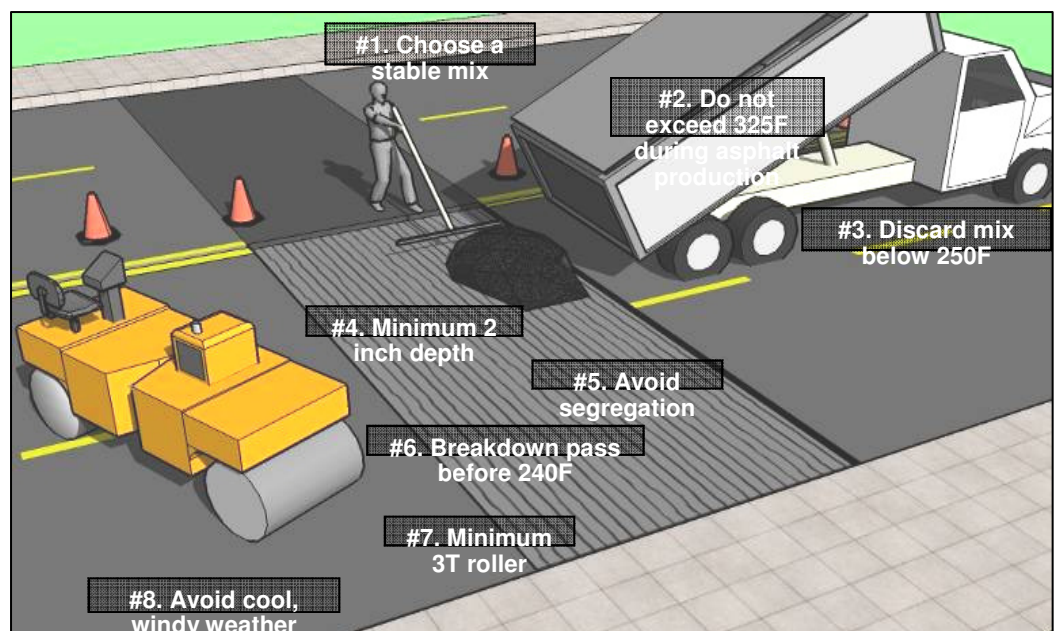
## Single Crosswalks

The milled out area is often too small to use a paving machine and must be paved with a shovel and asphalt rake (“hand-work”). There are certain challenges in achieving quality hand-work:

- .Asphalt Mix Design: The asphalt mix must be of suitable design for the traffic load but also have the workability required for hand work. Mixes with a nominal (largest) aggregate size greater than 1/2 inch should not be used as they will segregate when placed by hand. It is best to check with local consulting engineers if you are not sure of the mix to use in your area.
- .Asphalt Production: Do not heat the asphalt above 325 F at the plant in an effort to provide hotter mix for hand work. may burn the asphalt cement, resulting in raveling.
- .Asphalt Mix Transport: Because hand work is slower, the mix may sit in the truck much longer resulting in it cooling. Any mix in the truck that cools below 250F should be discarded. Always tarp the load and keep it tarped throughout the process.
- .Mill and fill depth = 2” minimum: Lack of compaction and pavement failure will result if less than two inches of asphalt is used. Asphalt will cool quicker if less material is placed, and will not allow enough time for compaction. hard and fast rule is that deeper depth holds heat, even during hot weather.
- .Segregation: Larger stone becomes separated from smaller aggregates, resulting in a concentration of large aggregate or sand in one area of the mat that can lead to raveling. This segregation most commonly occurs during the raking process by:
  - over working (raking too much) the asphalt
  - casting rocks brought to the surface back onto the mat prior to rolling.
- .Compaction Temperature: It is critical that the first roller pass (breakdown) occurs before any portion of the hand laid pavement cools below 240F. Cooler breakdown temperatures will result in raveling which will cause DuraTherm failure.
- .Rolling: The roller used must be a least in the 3 to 5 ton range with vibratory capability. Be careful not to let any area of the placed mix cool below 240F prior to the first rolling pass.
- .Cold weather paving: When paving in cooler temperatures, especially in the fall, one must be even more careful when placing pavement by hand. ambient temperature should always be 50F and rising. Avoid cool, windy weather, especially in the fall.



Mill and Fill should be two feet wider than the DuraTherm crosswalk



# The Full Intersection Mill and Fill

- developed by the City of Los Angeles

Rather than focusing on just the crosswalks the entire intersection is removed and replaced using a large milling and paving machine. Due to the use of large paving machines, a higher and more consistent level of pavement quality can be achieved.

The existing asphalt on the adjoining streets can be repaved with no disruption to the intersection and crosswalks as they will be able to work away from the intersection. Another reason this strategy works well is that intersections often need treatment sooner than the rest of the street due to traffic turning, stopping and starting.

