

NEW BITUMINOUS TACK COAT SPECIFICATIONS

by Sam Gregory, LTAP Technical Expert

Applying a bituminous tack coat is an integral part of an asphalt paving project. Research by the asphalt industry and PennDOT on the use of tack coat has resulted in some recent changes to PennDOT's construction specifications. Whether you do your road paving in-house or contract it out, your municipality must be aware of these changes.



An insufficient tack coat application can lead to pavement failure.

Importance of Tack Coats

A tack coat is an application of liquid bituminous material to an existing surface to provide a sufficient bond between the surface being paved and the new course. Insufficient tack applications can lead to premature pavement failure.

Different pavement conditions require different tack applications to achieve a sufficient bond. It may be difficult to achieve a sufficient bond when overlaying a milled surface due to dust, fines that can't be removed, or texture of the milled surface. Such conditions may require higher application rates than paving over an existing asphalt surface. The old specifications simply required an application rate of asphalt emulsion tack (AET) that left a uniform residue rate (RR) of between 0.02 and 0.07 gallons per square yard.

In layman's terms, asphalt emulsion is a combination of asphalt, water, and an emulsifying agent. When the emulsion is cured and the water is driven out, the material that remains is the asphalt residue, which provides the adhesion to bond the surface courses together. Different classes of emulsions have differing asphalt residue content based on the percentage of water in the material.

Out with the Old, In with the New

The material that used to be called AET, or asphalt emulsion tack, is now identified under the new PennDOT specifications as TACK. A non-tracking tack called NTT/CNTT is also available. The emulsifier used when producing these materials can have a positive, cationic charge or a negative, anionic charge, depending on the supplier who is making it. Therefore, when purchasing tack coat material from different suppliers, a municipality must make sure that materials with opposite charges are not inadvertently combined.

According to PennDOT's research on tack coats, AET material does not have enough asphalt residue content (ARC) to provide an appropriate bond in all paving situations. The new material called TACK has a minimum asphalt residue content requirement of 57 percent, which is more than double the 28 percent in AET.

In addition, the regulations now include a non-tracking tack (NTT) material, which has an asphalt residue content of at least 50 percent. The increased asphalt residue content enhances its bonding capability.

The new specifications for the residue rates are based on surface types as well as condition.

Publication 408, Section 460.3, TABLE B

Surface Type	Uniform Asphalt Residue Rate (RR) (gallons per square yard)
New Bituminous Paving	0.03 to 0.05
Existing Bituminous Paving	0.04 to 0.07
Milled Surface (Bituminous & PCC)	0.04 to 0.08
Portland Cement Concrete	0.04 to 0.07

PennDOT specifications require a 100-foot test strip be constructed at the start of the paving project to verify the agreed-upon application rate. The application rate to achieve a uniform asphalt residual rate can be determined using the following equation:

$$AR = (RR/ARC)$$

AR is the application rate in gallons per square yard; the amount of asphalt sprayed by the distributor truck.

RR is the residual rate in gallons per square yard; the amount of emulsified asphalt remaining on the surface after it has broken and set.

ARC is the asphalt residue content (% divided by 100); the percentage amount of asphalt in the emulsified asphalt. It is provided on a bill of lading and expressed as a decimal.

EXAMPLE 1: Let's look at a sample equation using TACK. To properly bond a new surface to a surface that has been milled in this example, the RR must be 0.08 gallons per square yard. To get an application rate, simply divide this number by 0.57, the ARC of the tack.

$$AR = RR \div ARC$$

$$AR = .08 \div .57$$

$$AR = 0.14$$

The distributor will need to apply the tack at 0.14 gallons per square yard to meet the specified rate.

EXAMPLE 2: Here's another example using non-tracking tack (NTT) where the RR is .05 gallons per square yard.

$$AR = .05 \div .50$$

$$AR = 0.10$$

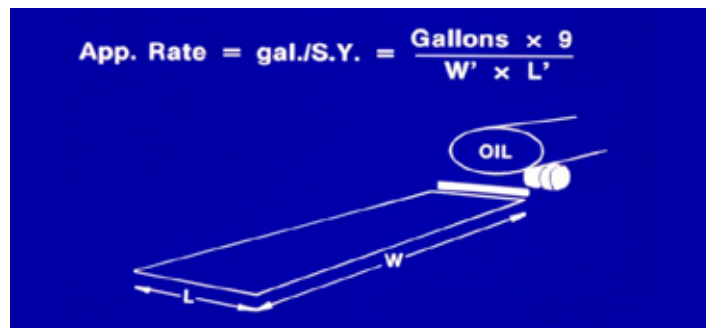
In this case, the distributor must apply the NTT at .10 gallons per square yard to meet the specification.

Increasing Longevity of a Pavement

Public works agencies are responsible for maintaining their roadway assets in an effective and efficient manner to ensure a paving project is successful and has longevity.

Research has shown that applying a tack coat correctly will improve the longevity of the pavement. The process of applying the right material the right way must be disseminated to the crew doing the work, whether the work is performed in-house or through a contractor. Deciding on the residual rate to achieve a successful bond and the application rate to obtain a bond should be discussed during the field view and pre-job conference.

Once the work has begun, the application rate should be checked to determine if the material is being applied at the correct rate. If you know the amount of tack that was shot and the length and width of the application, you can determine the gallons per square yard that must be applied.



A successful pavement preservation program follows the rule of “right”: applying the *right* treatment to the *right* road at the *right* time. Likewise, performing a paving operation the *right* way using the latest information on correctly applying a tack coat can go a long way in achieving the expected longevity of your projects.

Even if you use a contractor for your pavement project, everyone — including your municipality — has a responsibility to ensure the project's success, especially since premature failure to an asphalt pavement may not show up right away. So, why not do your part to help make sure the project ultimately performs to expectations?



Proper tack application is critical if a pavement project is to perform to expectations and last a long time.

If you have any questions, you can call LTAP at 1-800-FOR-LTAP for assistance.