



STATE OF MINNESOTA
OFFICE MEMORANDUM

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TO: Resident Engineers
Materials Engineers

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SUBJECT: Warm Mix Asphalt Guidance

As the construction season quickly approaches some of you are already getting questions from Contractors about using warm mix asphalt (WMA) on your upcoming and carry-over bituminous paving projects. Since the specification is silent on WMA I want to provide some background and guidance on its use.

WMA processes generally reduce the viscosity of the asphalt through a variety of means and enable the complete coating of aggregates at temperatures 35 to 100°F lower than conventional hot mix asphalt (HMA). Lower mixing temperatures allow producers to get closer to a fumes-free asphalt mix and will result in lower plant and field emissions and radiated heat. WMA also reduces energy consumption at the plant.

Nationally, initial studies show WMA may improve mixture durability by reducing production aging of the mixture and the ability to haul mixture longer distances without the worry of losing mix temperature. Warm mixes may also allow faster construction of pavements which need to be opened to traffic as soon as possible. Because the mix is not so hot to begin with, less time is required to cool the mix before the next lift is placed.

At the present time there are over 20 different WMA processes available. The most common processes used in Minnesota are foaming systems and a chemical additive (Evotherm). Some of our MnDOT Districts and other local agencies have already utilized WMA on various paving projects. To date, we have not experienced any issues with regard to WMA construction. Additionally, I am not aware of any issues relating to WMA construction on the national level.

Since there is no language in the specification precluding its use WMA is an acceptable alternative to HMA. However, the laboratories performing the testing of WMA need to be aware of its use so that they can adjust their laboratory compaction temperatures. Additionally, please notify the Bituminous Office of any projects utilizing WMA so that we can track these projects. If you have any questions regarding this subject please contact me at 651-366-5577 or at john.garrity@state.mn.us.

Frequently Asked Questions about Warm Mix Asphalt (WMA)

Warm Mix Asphalt (WMA) is a relatively new technology in the United States and in Minnesota in particular. The list below is not an exhaustive list of questions about warm mix, but it does try to answer some of the most common questions about this technology.

What is Warm Mix Asphalt?

Warm Mix Asphalt (WMA) is the generic term for any technology (additive or water foaming technique) added to an asphalt mixture that allows the mixing and compaction temperature to be reduced by 20 to 100°F. It allows the mix to remain workable at lower temperatures, and has potential environmental, operational, and performance benefits over traditional hot mix asphalt (HMA).

The contractor has approached us (local agencies) about substituting WMA for HMA. Should we use WMA on our project?

Mn/DOT supports the use of WMA as an alternate to HMA on most projects.

Should we pay an additional cost for warm mix?

The use of WMA may add between \$0.60 to \$2.00 per ton of mix, although as WMA becomes more commonly used that price differential should be reduced. However, agencies should not pay the additional costs if WMA is proposed after the project has already been let.

Are there any pavement performance issues with WMA?

The oldest WMA projects in the US are only 6 years old, so no long term performance data is available. Early rutting and moisture damage are potentially of concern, although no known WMA projects have shown these distresses to date.

With the increased use of RAP and/or shingles, are we getting complete blending between the recycled and virgin binders?

A recently completed national study showed through laboratory testing that WMA including 25% RAP did achieve adequate blending. However, at high percentages of RAP or RAS and at low production temperatures blending is still a concern.

Are there any different procedures required for QC/QA testing?

Aside from using lower lab compaction temperatures (recommended by the Contractor or WMA supplier), there should be no differences in laboratory test procedures between WMA and HMA.

How do I perform a WMA mix design?

For mixtures with binder absorption less than 1%, WMA technology may simply be “dropped in” to an approved HMA mix design.

Can modified binders be used with WMA?

WMA has been used with modified binders (polymers, PPA, etc.) with success.

What traffic levels can WMA be used on?

Until questions about early rutting are answered, WMA should be limited to Traffic Level 4 and lower.

Where can I get more information on WMA?

Visit the websites www.warmmixasphalt.com or www.fhwa.dot.gov/pavement/asphalt/wma.cfm . Alternatively, call John Garrity, Mn/DOT Bituminous Engineer, at 651-366-5577 or Tim Clyne, MnROAD Operations Engineer, at 651-366-5473.

