Warm-Mix Asphalt: An Opportunity for Environmental Protection

*By Dawid Kierys, Environmental Engineer, U.S. EPA – Region 5*

The US Environmental Protection Agency, Region 5, is seeking to work with local governments to reduce emissions from asphalt production by increasing the use of Warm Mix Asphalt (WMA). WMA is an alternative to traditional Hot-Mix Asphalt (HMA) with equivalent performance at temperatures 50-100 degrees F lower. WMA also works as a compaction tool for contractors seeking to achieve contract densities faster and easier than HMA.  WMA uses the same production equipment as HMA, but achieves lower temperatures through the addition of chemical or organic additives or water.

While improving paving operations, WMA also provides many environmental benefits. Adoption of WMA technology can reduce energy use by 20-30% along with odors and air emissions – see table below – like “blue smoke” that are harmful to workers and neighbors, especially children and other vulnerable populations. The [Federal Highway Administration](https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/pdf/wmafnlweb.pdf) and the [National Asphalt Pavement Association](http://driveasphalt.org/assets/content/resources/IS-134_WMA_Contractors_Experiences.pdf) both recognize the benefits of warm mix for the environment and for asphalt production economics. Please reference the studies at the end for more information on energy and emissions reductions.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Pollutant: | CO2 | VOCs | NO­x | SO2 | CO | PM |
| Emissions Reduction (%): | 30%-40% | 50% | 60%-70% | 30%-40% | 10%-30% | 20%-25% |

There are approximately 200 asphalt plants in Illinois – see link [here](http://www.il-asphalt.org/index.php/resources/find_a_contractor/getAccountList/?serviceCategory=78&keywords=) – that are either contractors to the Illinois Department of Transportation (IDOT) or that are members of the Illinois Asphalt Pavement Association (IAPA) – locations of these asphalt plants can be found in the link and attachments here. There are additional asphalt plants that are neither IDOT contractors or IAPA members. As of 2016, only 16 percent of Illinois asphalt production used the warm mix process.

To increase supply and availability of WMA, municipalities can write specifications requiring its use, or write more contracts and bids asking for WMA. The cities of [Portland](https://www.portlandoregon.gov/brfs/article/368274) and [Eugene, Oregon](http://www2.apwa.net/Documents/Advocacy/Eugene%20Pavement%20Preservation%20Case%20Study.pdf), have changed contracting standards for asphalt paving to require the use of WMA, leading to adoption of warm mix technology by local asphalt production plants. Other institutions like the [Illinois State Toll Highway Authority](https://www.forconstructionpros.com/asphalt/article/10758434/illinois-tollway-uses-warm-mix-asphalt) and [O’Hare International Airport](https://www.forconstructionpros.com/asphalt/article/10622563/warm-mix-asphalt-at-ohare-international-airport) also mandate warm mix in their asphalt contracts.

Many municipal governments might not know about WMA or that it’s permitted because the Illinois Department of Transportation had the specification written up for many years as a [special provision](http://www.idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Design-&-Environment/BDE-Special-Provisions/80288.pdf) not included in the standard specification book. Currently, IDOT does permit the use of WMA in their [specifications](http://www.idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Design-&-Environment/BDE-Special-Provisions/80288.pdf), leaving the choice to the contractor or local authority. We believe that other government agencies who issue paving contracts should consider this sustainable contracting approach. Please contact, Alexis Cain, at (312) 886-7018 or cain.alexis@epa.gov

References:

“Quantifying the environmental burdens of the hot mix asphalt (HMA) pavements and the production of warm mix asphalt (WMA)”:

<https://ac.els-cdn.com/S1996681416300025/1-s2.0-S1996681416300025-main.pdf?_tid=170c9644-133c-11e8-b173-00000aacb35e&acdnat=1518801124_e9359455b7552ba20579937831328818>

“Warm Mix Asphalt (WMA) Emission Reductions and Energy Savings”:

<http://www.asphaltpavement.org/big_files/11mwmx/Papers/WM66_Frank.pdf>

“A Synthesis of Warm-Mix Asphalt”:

<https://static.tti.tamu.edu/tti.tamu.edu/documents/0-5597-1.pdf>