Asphalt Pavement Mix Types

A Descriptive Look at Asphalt Pavement Mix Types Used in Texas Today
Dense Graded Mixtures

SPECIFICATION
ITEM 340,341

APPLICATIONS
Dense graded mixtures in the QC/QA specification can be used for a wide variety of applications ranging from new construction to overlays. Dense graded mixtures may be appropriate for applications ranging from high volume (or high demand) roadways to low volume (or low demand) roadways depending on the specified binder grade, aggregate properties, etc. Dense graded mixtures can be used as base, intermediate or surface layers.

ADVANTAGES
- The primary advantage of dense graded mixtures compared to other mixtures is lower initial cost.
- Another advantage is that most contractors and HMA producers are generally familiar with the production and placement of dense graded mixtures.
- The mixtures listed in the QC/QA specification are identical to those listed in the method specification.

ADDITIONAL INFORMATION
Dense graded mixtures have been used in Texas for over 50 years. They are usually designed with a Texas gyratory compactor which creates dry mixes. The vast majority of the QC/QA measures are the responsibility of the contractor.
APPLICATIONS

PFC mixtures are used as the surface course on high-speed roadways to optimize the safety and comfort characteristics of the roadway. For this guide, a high-speed roadway is defined as one having a posted speed limit of 45 mph or higher. The standard PFC mixture contains PG 76-22 and fibers and is recommended for the vast majority applications where PFC is used. A-R PFC is often preferred over the standard PFC when placed as an overlay on an existing concrete pavement, when a high degree of noise reduction is desired and when placed as an overlay on a pavement that has a high amount of cracking.

ADVANTAGES

- As opposed to all other types of hot mix, PFC is designed to let water drain through the PFC mixture and off the pavement structure.
- PFC mixtures significantly reduce the risk of hydroplaning, reduce water spray, improve wet weather visibility and visibility of pavement markings, significantly reduce tire noise, and restore ride quality.
- More recently, PFC mixes have also been shown to improve the quality of storm water runoff.

ADDITIONAL INFORMATION

A-R PFC is generally more expensive than the standard PFC; however, its unique properties warrant its use in certain applications.
Superpave Mixtures

APPLICATIONS
Superpave mixtures are usually used on medium to high volume roadways, performance design mixtures may be appropriate for applications ranging from high volume (or high demand) roadways to low volume (or low demand) roadways. Superpave mixtures can be used as base, intermediate or surface layers. Superpave mixtures can be used for a wide variety of applications ranging from new construction to overlays.

ADVANTAGES
As compared to the 7897A specification used for dense-graded mixtures, one of the primary advantages of performance design mixtures is that the mixture design procedures allows one to adjust the binder content (by adjusting the $N_{	ext{gdr}}$ gyrations) depending on the intended application. The higher asphalt will help mitigate cracking and provides for greater durability.

Another advantage is that Superpave mixtures can be designed coarse enough to have stone on stone contact. Achieving stone on stone contact can yield a mix that is highly resistant to rutting and have a coarse surface texture. The coarse surface texture can be beneficial in terms of wet weather traction.

ADDITIONAL INFORMATION
Superpave Mixtures set the bar higher for the contractors to meet in-place density. By using a superpave gyratory compactor it allows for more oil which will help lead to longer lasting asphalt pavements.
**Stone Matrix Asphalt (SMA)**

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**SPECIFICATION**

**ITEM 346**

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**APPLICATIONS**

SMA mixtures are typically used as a surface mix or intermediate layer in the pavement structure on high volume (or high demand) roadways. The standard SMA mixture contains PG 76-22 and fibers, and is recommended for the vast majority of applications where SMA is used/desired and when placed as an overlay on a pavement that has a high amount of cracking.

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**ADVANTAGES**

SMA mixtures provide both excellent rut resistance and crack resistance. SMA mixtures have a high concentration of coarse aggregate, which facilitates stone on stone contact. The voids in the coarse aggregate skeleton are filled with fibers, mineral filler, and a relatively high amount (6% minimum) of polymer modified asphalt. This combination of materials allows for a “rich” mixture that is resistant to cracking while at the same time being highly resistant to rutting. SMA mixtures are considered to be relatively impermeable, particularly when compared to performance design mixtures. SMA mixtures result in a pavement layer that has a high degree of surface texture which is beneficial in terms of wet weather traction.

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**ADDITIONAL INFORMATION**

SMA mixes are usually an intermediate layer with PFC placed as the surface layer, although they work excellent as surface courses. SMA contains higher oil contents and require higher quality aggregates which tend to increase the costs when compared to dense graded mixes.
Thin Overlay Mix

SPECIFICATION

ITEM 347

APPLICATIONS

TOM mix is a high-performance overlay mix placed at a thickness between ½” to 1 ¼”. It is primarily used for preservation of existing pavements, high and low volume roadways, and roadways where a crack-resistant mix is needed.

ADVANTAGES

- Durable, flexible and resistant to rutting and/or cracking.
- Helps improve ride quality and reduce noise levels.
- Stone on stone contact yields a mix that is highly resistant to rutting with a coarse surface texture.
- Coarse surface texture can be beneficial in terms of wet weather traction.

ADDITIONAL INFORMATION

- Higher asphalt content, sometimes as much as 7.0% depending on aggregate combinations.
- Requires higher quality aggregates than conventional mixes.
- Typically uses a 70-22 or 76-22 oil.
- Must meet a minimum 300 cycles on the overlay tester and applicable Hamburg test.
TBFC mixtures are used as a surface course on high-speed roadways to optimize the safety and comfort characteristics of the roadway. TBPFC mixtures may be placed in thin lines starting at ¾-inch. TBFC includes an application of a polymer modified emulsion membrane prior to the placement of the PFC mixture. The materials and mixture requirements for the TBFC placed on the membrane are the same as those specified in Item 342. TBFC is recommended in lieu of PFC from Item 342 when placed as an overlay on an existing concrete pavement or when placed as an overlay on a pavement that has a high amount of cracking.

ADVANTAGES

TBFC is essentially applied over a polymer modified emulsion membrane. It therefore offers the same advantages listed for PFC plus the advantages of the polymer modified emulsion membrane. TBFC mixtures are typically placed from ¾ to 1.5 inch thick.

ADDITIONAL INFORMATION

TBFC have a higher initial cost compared to other mixes. The process calls for specialized equipment that may not be available at all times during construction. The asphalt content ranges from 6% to 8% compared to other mixes.
More than 94 percent of the paved roads and highways in the United States are surfaced with asphalt. One of the reasons that asphalt pavement is so widely used is the versatility of the product and its ability to be used in new construction, rehabilitation and preventive maintenance projects. Today’s asphalt pavement is a high-tech product that can meet every pavement need from bike paths and driveways to interstate highways and airport runways. In Texas we have an exceptional history of providing a quality, safe and efficient highway transportation system for the traveling public. The Texas Department of Transportation and the Texas Asphalt Pavement Association have partnered together for many years to build, rehabilitate and maintain more than 80,000 miles roadways that exist on the state’s system today. For more information about asphalt pavement mix types being used in Texas today, please contact the Texas Asphalt Pavement Association.