

414-R-643 ULTRATHIN BONDED WEARING COURSE

(Adopted 06-16-16)

The Standard Specifications are revised as follows:

SECTION 414, BEGIN LINE 16, DELETE AND INSERT AS FOLLOWS:

414.02 Materials

Materials shall be in accordance with the following:

Asphalt Emulsion	414.02(a)
Asphalt Materials	
PG Binder, PG 64-22, PG 70-22 76-22	902.01(a) and 414.02(b)
PG Binder Grade	414.02(b)
Coarse Aggregates, Class A or Higher	904.03 and 414.02(c)
Fine Aggregates	904.02
Mineral Filler	904.02(f)

SECTION 414, BEGIN LINE 32, DELETE AND INSERT AS FOLLOWS:

(b) Asphalt Materials

The PG binder grade shall be selected based on the following requirements:

PG BINDER	ESAL
64-22	< 10,000,000
70-22 76-22	≥ 10,000,000

Additional requirements for the PG ~~70-22~~ 76-22 binder as follows:

CHARACTERISTIC	TEST METHOD	MIN.	MAX.
Separation, % prepared by ASTM D 7173	AASHTO T 53		6°C
Elastic Recovery, @ 39°F (4°C), %	AASHTO T 301	60	

SECTION 414, BEGIN LINE 44, DELETE AND INSERT AS FOLLOWS:

414.03 Job Design Mix Formula

The ~~job design~~ mix formula, ~~JMF~~DMF, shall be determined for each mixture prepared by an Approved Mix Design Laboratory ~~in accordance with 414.04 selected from the Department's list of approved Mix Design Laboratories~~. The Contractor shall submit a ~~JMF~~ DMF for each mixture to the Engineer one week prior to use. The ~~JMF~~ DMF shall state the maximum particle size in the mixture, ~~the mixture gradation, the total aggregate bulk specific gravity, the maximum and bulk specific gravity of the UBWC mixture~~ and the application rate for any anti-stripping additives. No mixture will be accepted until the ~~JMF~~DMF is approved.

SECTION 414, AFTER LINE 59, INSERT AS FOLLOWS:

The maximum specific gravity of the UBWC mixture shall be mass determined in water in accordance with AASHTO T 209.

The bulk specific gravity of the UBWC mixture shall be determined in accordance with AASHTO T 331.

SECTION 414, BEGIN LINE 70, DELETE AND INSERT AS FOLLOWS:

(1) Follow AASHTO T 283 with the following exceptions:

- (a) Condition the mixture for ~~2-h~~ 4 h in accordance with AASHTO R 30, Section 7.1.
- (b) Compact the Superpave Gyratory Compactor, SGC, specimens to 100 gyrations.
- (c) Extrude the samples as soon as possible without damage to the sample.
- (d) Use AASHTO T 269 to determine the void content.
- (e) Record the void content of the specimens.
- (f) If less than 55% saturation is achieved, the procedure does not need to be repeated unless the difference in tensile strength between duplicate specimens is greater than 25 lbs/sq in.

414.05 Use of Recycled Materials

~~Recycled materials may consist of reclaimed asphalt pavement, RAP, or reclaimed asphalt shingles, RAS or a blend of both. RAP shall be the product resulting from the cold milling or crushing of an existing HMA pavement. The RAP shall be processed so that 100% will pass the 2 in. (50 mm) sieve when entering the HMA plant. RAP shall be in accordance with 401.06 for dense graded surfaces except RAP for use in the UBWC mixture shall be 100% passing the 3/8 in. (9.5 mm) sieve and 95 to 100% passing the No. 4 (4.75 mm) sieve.~~

~~Recycled materials may be used as a substitute for a portion of the new materials required to produce UBWC mixtures. The amount of total binder replaced by binder in the recycled material shall be computed as follows:~~

$$\text{Binder Replacement, \%} = \frac{(A \times B) + (C \times D)}{E} \times 100\%$$

where:

- A = RAP, % Binder Content
- B = RAP, % in Mixture
- C = RAS, % Binder Content
- D = RAS, % in Mixture
- E = Total, % Binder Content in Mixture

~~RAS may be obtained from either pre-consumer or post-consumer asphalt shingles. Post-consumer asphalt shingles shall be in accordance with AASHTO MP 15 and prepared by a processing company with an IDEM Legitimate Use Approval letter. A copy of this letter shall be submitted to the Engineer. Deleterious material present in post-consumer asphalt shingles shall be limited to the percentages stated in AASHTO MP 15. Pre-consumer and post-consumer asphalt shingles shall not be blended for use in UBWC mixtures and shall be stockpiled separately from other materials.~~

~~The recycled material percentages shall be as specified on the JMF. UBWC mixtures utilizing recycled materials shall be limited to 25% binder replacement and shall use the specified binder grade.~~

~~The combined aggregate properties shall be in accordance with 904. The combined aggregate bulk specific gravity shall be determined in accordance with ITM 584 and the combined aggregate gradation shall be in accordance with 414.04.~~

414.06 Quality Control

The Contractor shall produce a mixture in compliance with the ~~JMFDMF~~ within the limits of the quality control tolerances. The Contractor shall maintain all quality control documentation and make a copy available to the Engineer upon request or at completion of work.

The Contractor shall sample the mix a minimum once per day in accordance with ITM 580, section 8.6 Truck Samples, Dense Graded HMA Mixture. The sample shall be tested for binder content and gradation prior to the next day's production.

The Contractor shall take corrective action when the binder content exceeds $\pm 0.5\%$ from that stated in the ~~JMFDMF~~ as tested in accordance with ITM 586.

The Contractor shall take corrective action when the aggregate gradation exceeds the following values from that stated in the ~~JMFDMF~~ as tested in accordance with AASHTO T 30.

SECTION 414, BEGIN LINE 196, DELETE AND INSERT AS FOLLOWS:

414.13 Smoothness

~~All finished surface irregularities in excess of 1/8 in. measured with a 10 ft straightedge shall be corrected.~~ *A straightedge in accordance with 409.03(f) will be used to determine smoothness. The 16 ft straightedge will be used to accept smoothness along the direction of mainline traffic and the 10 ft straightedge will be used to accept smoothness transverse to the direction of mainline traffic. Smoothness correction shall be in accordance with 401.18(c).*
