SECTION 413
PLANTMIX BITUMINOUS GAP-GRADED SURFACE

DESCRIPTION

413.01.01 GENERAL
A. This work shall consist of placing a gap-graded wearing course, bonded to the surface, in accordance with these specifications and in conformity with the lines, grades, thickness, and the typical cross sections shown on the plans or established by the Engineer.
B. The bonded wearing course shall consist of an application of a warm polymer modified asphalt emulsion to create a polymer modified membrane (PMM) followed immediately with a hot gap-graded ultra-thin asphalt concrete surface course (UTACS).
C. This work shall not be started until the Contractor has completed all heavy equipment work or any other work that could scar or mar the finished gap-graded surface.
D. The requirements of Section 401, "Plantmix Bituminous Pavements – General," shall be applicable to this work, except as hereinafter specified.

413.01.02 REFERENCE CODES AND STANDARDS
A. Related Interagency Quality Assurance Committee (IQAC) procedures at:

413.01.03 REQUIREMENTS
A. Persons involved with the placement of UTACS shall be trained by the manufacturer and/or the Nevada T2 Program.

MATERIALS

413.02.01 GENERAL MATERIALS
A. The materials shall conform to Subsection 401.02.01, "Composition of Mixtures," with the following exceptions:
   1. Prior to starting work, the Contractor shall submit a proposed job-mix formula in writing for review and approval by the Engineer.
   2. The proposed job-mix formula shall be determined by an AASHTO certified testing laboratory, using Nevada Alliance for Quality Transportation Construction (NAQTC) certified technicians, based on the tests required to determine the gradation and surface capacity for coarse aggregate.
   3. The gradation shall be Type S1, S2, or S3 in accordance with Subsection 705.03.08, "Plantmix and Roadmix Asphalt Concrete Surface Course UTACS Type S1 through S3," and the contract Special Provisions.
   4. The bituminous materials shall be PG76-22CC in accordance with Section 703.03.02, "Asphalt Cements."
   4-B. Prior to the production of the UTACS gap-graded mix material, all of the contract aggregate quantity shall be stockpiled and shall be tested by the Contractor. The tests...
are to be submitted to the Engineer no earlier than two weeks prior to placement and may be used only after the Engineer has taken no exception to the results.

### 413.02.02 COMPOSITION OF GAP-GRADED (UTACS) MIXTURE

A. The plantmix gap-graded Ultra-Thin Asphalt Concrete Surface (UTACS) mixture shall be composed of aggregates and bituminous materials as described in these specifications. The criteria for the design is based on Subsection 413.02.01, “General Materials,” above and the following:

1. Film Thickness (\(\mu\)m):
   a. Gradation surface area factor using the film thickness calculation based on effective asphalt content and aggregate surface area according to Asphalt Institute MS-2 Table 6.1.
   b. The minimum film thickness shall be 10 \(\mu\)m.

2. Specimens for AASHTO T283 testing shall be compacted using the Superpave gyratory compactor applying 100 gyrations or using the Marshall compactor applying 50 blows on each side of the 4-inch diameter sample.
   a. Use mix quantity necessary to obtain compacted samples 2.5 inches \(\pm 0.05\) inch in height.
   b. Further test compacted samples regardless of air void levels achieved after 100 gyrations or 50 blows on each side.
   c. Apply vacuum to samples to be conditioned for 20 seconds and proceed without calculating percent saturation.
   d. Mixing and compaction temperatures are to be recommended by the binder supplier.
   e. The minimum moisture susceptibility shall be 80 percent retained strength.

3. The minimum air voids shall be 4 percent and the maximum aggregate surface shall be 26 square feet per pound.

4. Marshall stabilities are not required.

5. Gradation shall be in accordance with Subsection 705.03.08, "Plantmix and Roadmix Asphalt Concrete Surface Course UTACS Type S1 through S3" of Section 705, "Aggregates for Bituminous Courses."

6. The binder type shall be PG76-22CC as described in Section 703, "Bituminous Materials."

### 413.02.03 POLYMER MODIFIED MEMBRANE

A. The UTACS pavement shall consist of an application of a warm polymer modified membrane (PMM) asphalt emulsion, as specified under Section 703, "Bituminous Materials," followed immediately with an ultra-thin surface course of quality hot mix asphalt concrete.

B. The PMM emulsion shall be sprayed immediately prior to the application of the surface course so that no wheel or other part of the paving machine comes in contact with the PMM before the surface course is applied.
1. Should emulsion be spilled into the paver hopper, paving shall stop and all contaminated material shall be removed from the paver hopper.

2. Under no circumstances shall the contaminated material be placed on the roadway.

G. Overlapping or hot lapping of the bonded wearing course shall not be permitted when paving miscellaneous areas in order to achieve project layout requirements.

H. Material that has been placed through the paving screed or over the polymer modified asphalt emulsion membrane shall not be reintroduced into the paving process.

I. UTACS shall be applied at a thickness such that no aggregate is fractured.
   1. The S3 mix shall be applied at a minimum 3/4-inch thickness.
   2. The S2 mix shall be applied at a minimum 5/8-inch thickness.
   3. The S1 mix shall be applied at a minimum of 9/16-inch thickness.

413.03.04 SURFACE PREPARATION FOR UTACS

A. The following items shall be performed prior to the commencement of paving operations and paid for under the appropriate bid item numbers:
   1. Manhole covers, drains, grates, catch basins, and similar utility structures shall be protected and covered with building felt prior to paving, and shall also be clearly referenced for location and adjustment after paving.
   2. Thermoplastic traffic markings shall be removed.
   3. Pavement cracks and joints greater than 0.25 inches wide shall be cleaned and filled using an approved material and method.
      a. There shall be no over-banding of cracks which will be covered by UTACS.
      b. Crack sealing shall be completed at least 7 days prior to paving.
   4. Surface irregularities greater than 1 inch deep shall be milled and/or filled with a material approved by the Engineer. All repairs shall be completed 1 week prior to paving or as recommended by the sealant manufacturer or the Engineer.
   5. The entire pavement surface to be overlaid shall be thoroughly cleaned, giving special attention to accumulated mud and debris. Pressurized water and/or vacuum systems may be required to ensure a clean surface.
   6. Cold planing shall be completed as specified herein.

413.03.05 JOINTS

A. Longitudinal joints shall be constructed only on the shoulders or at the edge of the travel lanes.

413.03.06 QUALITY CONTROL ASPECTS

A. PMM application rate shall be checked twice per day using random sample location techniques.

B. Determination of the application rate of the PMM shall be as follows:
   1. At the location to be sampled, immediately adjacent to the paving area, use 2 pads approximately 3.3 feet 15-inches wide by 3.3 feet 20 inches long, placed side by side, to determine the PMM application rate based on the average of 2 application rate measurements.