

- ITEM 18403.133502 M - RUT AVOIDANCE ASPHALT CONCRETE, TYPE 3 RA**
- ITEM 18403.133512 M - PLANT PRODUCTION QUALITY ADJUSTMENT to 18403.133502 M**
- ITEM 18403.173502 M - RUT AVOIDANCE ASPHALT CONCRETE, TYPE 6F RA**
- ITEM 18403.173512 M - PLANT PRODUCTION QUALITY ADJUSTMENT to 18403.173502 M**
- ITEM 18403.193502 M - RUT AVOIDANCE ASPHALT CONCRETE, TYPE 7F RA**
- ITEM 18403.193512 M - PLANT PRODUCTION QUALITY ADJUSTMENT to 18403.193502 M**

The requirements of Section 403 - Hot Mix Asphalt Concrete Pavement shall apply except as modified and/or revised below.

DESCRIPTION

This work shall consist of constructing rut avoidance asphalt concrete pavement courses in accordance with these specifications and in reasonable close conformity with the required lines, grades, thicknesses, and typical sections shown on the plans or established by the Engineer.

MATERIALS

The materials and composition for these mixtures shall meet the requirements specified for Type 3 binder course, Type 6F and Type 7F top course in Subsection 401-2.01 through 401-2.05, except as noted herein. Mixture requirements shall be as follows.

The contractor shall formulate and submit to the Regional Director, a job mix formula that satisfies the design general limits listed in Table 1 - Rut Avoidance Mix Composition. The production tolerances in Table 1 will be permitted to exceed the design general limits.

Screen Size	BINDER		TOP			
	TYPE 3 RA		TYPE 6F RA		TYPE 7F RA	
	Design General Limits % Passing	Production Tol. %	Design General Limits % Passing	Production Tol. %	Design General Limits % Passing	Production Tol. %
37.5 mm	100	--				
25.0 mm	95-100	--	--			
19.0 mm	74-93	±5	100	--	--	
12.5 mm	58-73	±5	95-100	--	100	--
6.3 mm	38-53	±5	58-72	±5	90-100	--
3.2 mm	26-40	±4	36-54	±4	45-70	±4
850 µm	9-23	±4	15-32	±4	15-40	±4
425 µm	4-18	±4	8-25	±4	8-27	±4
180 µm	3-13	±3	4-16	±3	4-16	±3
75 µm	2-6	±2	2-6	±2	2-6	±2
% Asphalt	4.0-6.0	--	5.0-6.2	--	5.2-7.2	--

Table 1 - Rut Avoidance Mix Composition

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Subsection 401-2.03 A. Coarse Aggregate and 401-2.03 B. Blending shall be deleted and replaced with the following:

A. **Coarse Aggregates.** Top Course Type 6F RA and Type 7F RA Hot Mix Asphalt mixtures shall be from approved sources and meet one of the following requirements:

1. Coarse aggregates shall be crushed limestone having an acid insoluble residue content of not less than 20.0%, excluding particles of chert and similar siliceous rocks.
2. Coarse aggregates shall be crushed dolomite having an acid insoluble residue content of not less than 17.0%, excluding particles of chert and similar siliceous rocks.
3. Coarse aggregates shall be crushed sandstone, granite, chert, traprock, ore tailings, slag or other similar non-carbonate materials. Non-carbonate particles are defined as those having an acid insoluble residue content not less than 80.0%.
4. Coarse aggregates shall be crushed gravel or blends of two or more of the following types of materials; crushed gravel, limestone, dolomite, sandstone, granite, chert, traprock, ore tailings, slag or other similar materials. These aggregates must meet the following requirements:

For Type 6F RA mixes - not less than 10.0% (by weight with adjustments to equivalent volumes for materials of different specific gravities) of the total aggregate shall be plus 3.2 mm non-carbonate particles. In addition, not less than 20.0% of the plus 6.3 mm particles shall be non-carbonate.

For Type 7F RA mixes - not less than 10.0% (by weight with adjustments to equivalent volumes for materials of different specific gravities) of the total aggregate shall be plus 3.2 mm non-carbonate particles.

Non-carbonate particles are defined as those having an acid insoluble residue content not less than 80.0%.

B. **Blending.** Where coarse aggregates for these mixes are from more than one source or of more than one type of material, they shall be proportioned and blended to provide a uniform mixture.

C. **Mix Properties.** The mixtures shall meet the Marshall property criteria appearing in Table 2 - Marshall Mix Property Criteria.

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Mix Property	This Specification has been Disapproved as a result of the issuance of ED 09-001		
	Type 3RA	Type 6FRA	Type 7FRA
Stability, N, min.	6700	6700	6700
Flow, 0.25 mm, min.	8	8	8
Marshall Quotient, (Stability/Flow), min.	670	670	670
Air Voids, percent	3.0 - 5.0	3.0 - 5.0	3.0 - 5.0
Voids in Mineral Agg. (VMA), percent min.	12.0	14.0	16.0
Voids Filled with Asphalt (VFA), percent	65-75	65-75	65-75

Table 2 - Marshall Mix Property Criteria

D. MIX PREPARATION. The Marshall specimens shall be prepared, mix properties determined, and completed mix design submitted in accordance with the procedures outlined by Department written instructions with the following modifications:

1. Compactive effort shall be 75 blows per side.
2. Five point asphalt cement content Marshall design is required prior to production. One point designs are not acceptable.
3. The minimum specified VMA shall be met at each of the five mix design asphalt cement contents.
4. The Marshall quotient is calculated as the corresponding ratio of corrected stability (N) to flow value (0.25 mm).
5. The optimum asphalt cement content shall be determined by the "Range" method. Graphs shall be constructed for each of the specified mix design properties (stability, flow, Marshall quotient, air voids, VMA, and VFA) using each property as the vertical axis and percent asphalt cement content as the horizontal axis. The plotted values in each graph shall be fitted with a smooth curve that obtains the "best fit" for all values. A vertical line is drawn at the point where the asphalt cement content provides the acceptable lower and upper limits for the properties of stability, flow, Marshall quotient, air voids, VMA, and VFA. The mid-point of the common overlap is the optimum asphalt cement content.

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CONSTRUCTION DETAILS

The provisions of §401-3 Construction Details shall apply.

METHOD OF MEASUREMENT

The provisions of §401-4, §402-4 and §403-4, Method of Measurement shall apply.

BASIS OF PAYMENT

The provisions of §403-5 Basis of Payment shall apply.

Payment will be made under:

This
Specification
has been
Disapproved
as a result of
the issuance of
ED 99-001

ITEM NO.	ITEM	PAY UNIT
18403.133502 M	Rut Avoidance Asphalt Concrete With In-Place Density Monitoring - Type 3 RA	Metric Ton
18403.133512 M	Plant Production Quality Adjustment to 18403.133502 M	Quality Unit
18403.173502 M	Rut Avoidance Asphalt Concrete With In-Place Density Monitoring - Type 6F RA	Metric Ton
18403.173512 M	Plant Production Quality Adjustment to 18403.173502 M	Quality Unit
18403.193502 M	Rut Avoidance Asphalt Concrete With In-Place Density Monitoring - Type 7F RA	Metric Ton
18403.193512 M	Plant Production Quality Adjustment to 18403.193502 M	Quality Unit