

Date: May 29, 2015

To: MAG Specifications and Details Committee

From: Jeff Benedict, Chairman MAG Asphalt Working Group

Subject: Revisions to Sections 717

Case # 15-11

PURPOSE: Incorporate revisions to Section 717, "*Mix Design Requirements*" into the MAG Specifications.

REVISIONS:

717.3.1 - Added clarification in regard to the mineral admixture calculation as prescribed under the Arizona Test Method 832. Currently, admixtures are incorporated as a percentage of the total aggregate when submitting new designs and are approved as such. That is the admixture is seen as a percentage of the aggregate (totals 100%).

The Arizona Test Method 832 is an ADOT method requiring admixtures to be back calculated after the aggregates are determined (totals 101 – 102% and must be back calculated to 100% proportionately by each percentage of contributing aggregates to the mix)

TABLE 717-4		
COARSE/FINE AGGREGATE REQUIREMENTS		
Characteristics	Test Method	Requirements
Fractured Faces, % (Plus No. 8)	ARIZ-212	85, 1 fracture 80, 2 or more
Uncompacted Voids, %	ARIZ-247	45.0 (High Traffic Volume) 42.0 (Low Traffic Volume)
Sand Equivalent (Minus No. 4)	AASHTO T-176	65 minimum
Plasticity Index	AASHTO T-89 & T-90	Non Plastic
L.A. Abrasion, % Loss	AASHTO T-96	9 max. @ 100 Rev. 40 max. @ 500 Rev.
Combined Bulk Specific Gravity	AI MS-2	2.35-2.85
Combined Water Absorption, %	AI MS-2	0-2.5

717.2.3 Mineral Admixture: Mineral admixture used in ARAC shall be dry hydrated lime conforming to the requirements of ASTM C1097 or Portland cement conforming to ASTM C150 for Type II, or ASTM C595 for Type IP. The minimum mineral admixture content will be 1.0percent, by weight of total aggregate.

717.3 MIX DESIGN REQUIREMENT:

717.3.1 General: The mix design for ARAC shall be prepared by a laboratory that is accredited through the AASHTO Accreditation Program (AAP) in Hot Mix Asphalt Aggregates and Hot Mix Asphalt. The laboratory shall be under the direct supervision of a Civil Engineer, registered by the State of Arizona, and who is listed by ADOT as a "Qualified Asphalt Concrete Mix Design Engineer" within ADOT's latest list of approved laboratories. The latest list of approved laboratories is available on ADOT's web page: http://www.azdot.gov/highways/materials/quality_assurance.asp.

The date of the design shall not be older than two years from the date of submittal, unless supportive documentation is provided and approved by the Engineer.

The mix design method used shall be in accordance with the Marshall Mix procedure, 75 blows, as described in Arizona Test Method 832 "Marshall Mix Design Method for Asphaltic Concrete (Asphalt Rubber) [AR-AC]" with the exception that mineral admixture shall be considered part of the total weight of aggregate and pounds per cubic foot shall be calculated by using Asphalt Institute's Manual MS-2. Mix designs are subject to approval by the Engineer.

Comment [GG1]: This wording makes it consistent with current designs that have been submitted and approved by MCDOT.

717.3.2 Mix Design Criteria: The mix shall comply with the criteria in Table [717-5](#) below.

TABLE 717-5		
MARSHALL MIX DESIGN CRITERIA		
Criteria	Low Volume Traffic	High Volume Traffic
ARB Content		
1" and 1-1/2" Overlay Thickness	8.4% minimum	8.0% minimum
2" Overlay Thickness	N/A	7.0% minimum
Mixture Air Voids, %	3.5-4.5	4.5-5.5
Voids in Mineral Aggregate, %	19.0 min	19.0 min
Tensile Strength Ratio, AASHTO T-283	65% minimum	65% minimum
Marshall Stability, pounds minimum	800	800
Marshall Flow, 0.01 inch minimum	16	16

The mix design report shall include the following elements as a minimum.

- (1) The name and address of the testing organization and the person responsible for the mix design report.
- (2) The mix plant identification and/or location, as well as the supplier or producer name.
- (3) The traffic condition (low or high traffic) and lift thickness.
- (4) A description of all products that are incorporated in the ARAC along with the sources of all products, including the base asphalt cement, crumb rubber, mineral aggregate, and admixtures.