

POLYMER MODIFIED TERMINAL BLENDED RUBBERIZED ASPHALTIC CONCRETE**719.1 DESCRIPTION:**

The work under this section shall consist of furnishing, proportioning and mixing all the ingredients necessary to produce a polymer modified terminal blended rubberized asphalt concrete (PMTBRAC) material. PMTBRAC mixes may be used for all traffic conditions, as determined by the agency

719.2 MATERIALS:

719.2.1 Binder 76-22 TR (PMTBRAC): The binder used in PMTBRAC shall meet the requirements of Table 711-2 as specified by the engineer.

719.2.2 Aggregate: Coarse and fine aggregates shall conform to the applicable requirements of Tables 719-1 and 719-2 below. Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert material with similar characteristics, or a combination thereof, conforming to the requirements of these specifications.

Coarse aggregate is material retained above the Number 8 sieve and fine aggregate is material passing the Number 8 sieve. Aggregates shall be free of deleterious materials, clay balls, and adhering films or other material that prevent thorough coating with the asphalt cement. Mineral aggregate shall conform to the following requirements when tested in accordance with the applicable test methods.

| TABLE 719-1 | |
|---|------------------------|
| MIX DESIGN GRADATION REQUIREMENTS WITH MINERAL ADMIXTURE | |
| Sieve Size | Percent Passing |
| 1" (25 mm) | 100 |
| ¾" (19 mm) | 100 |
| ½" (12.5 mm) | 90-100 |
| ⅜" (9.5 mm) | 75-90 |
| No. 8 (2.36 mm) | 40-50 |
| No. 40 (425 µm) | 10-20 |
| No. 200 (75 µm) | 2.0-10.0 |

The combined aggregate properties shall conform to the requirements of Table 719-2.

719.2.3 Mineral Admixture: Mineral admixture used in PMTBRAC 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 1.0 percent, by weight of total aggregate. Mineral admixture shall be considered part of the total weight of aggregate and all combined specific gravity and combined water absorption calculations for aggregates and mineral admixture will be done in accordance with the latest edition of the Asphalt Institute's Manual MS-2 (AI MS-2).

| TABLE 719-2 | | |
|---|------------------------|---|
| COARSE/FINE AGGREGATE REQUIREMENTS | | |
| Characteristics | Test Method | Requirements |
| Fractured Faces, % (Plus No. 8) | ARIZ-212 | 85, 1 fracture 80, 2 or more |
| Uncompacted Voids, % | AASHTO T-304, Method A | 45.0 |
| Sand Equivalent (Minus No. 4) | AASHTO T-176 | 50 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 |

719.3 MIX DESIGN REQUIREMENT:

719.3.1 General: The mix design for PMTBRAC 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 Asphaltic 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 www.azdot.gov. The date of the design shall not be older than one year from the date of submittal, unless supportive documentation is provided and approved by the Engineer.

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) A description of all products that are incorporated in the asphalt concrete along with the sources of all products, including admixtures and asphalt binder, and their method of introduction.
- (4) The supplier and grade of asphalt binder, the source and type of mineral aggregate, and the percentage of asphalt binder and mineral admixture used.
- (5) The mix design report shall identify this as a Marshall 75-blow mix design
- (6) The results of all testing, determinations, etc., such as: specific gravity and gradation of each component, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, Tensile Strength Ratio (ASTM [D4867](#)), Marshall stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and bulk density. Historical abrasion values may be supplied on existing sources. The submittal should include a plot of the gradation on the Federal Highway Administration’s 0.45 Power Gradation Chart, plots of the compaction curves and the results of moisture sensitivity testing.
- (7) The laboratory mixing and compaction temperature ranges for the supplier and grade of asphalt binder used within the mix design, and a copy of the supplier’s temperature-viscosity curve and specific gravity at 77°F.
- (8) A specific recommendation for design asphalt binder content and any limiting conditions that may be associated with the use of the design, such as minimum percentages of crushed or washed fine aggregate.
- (9) The supplier’s product code, the laboratory Engineer’s seal (signed and dated), and the date the design was performed.

The mix design shall be submitted to the Agency or Engineer by the Contractor/Supplier for which it was developed as part of his project submittals. Once the mix design has been approved by the agency or Engineer, the Contractor and/or his supplier shall not change plants nor use additional mixing plants without prior approval of the Engineer. A new mix design shall be submitted when any changes occur in the plant operation, the producer’s pit, the asphalt binder, including modifiers in the asphalt binder, or any other item that will cause an adjustment in the mix.

719.3.2 Mix Design Criteria: The mix design shall be performed by the Marshall Mix Design method. A minimum of 4 points will be used to establish the mix design results. The oven aging period for Marshall mix design samples shall be 2 hours.

719.3.2.1 Marshall Mix Design: The Marshall Mix Design shall be performed in accordance with the requirements of the latest edition of the Asphalt Institute’s Manual, MS-2 “Mix Design Methods for Asphalt Concrete.” The mix shall use the compactive effort of 75 blows per side of specimen, unless specified otherwise by the engineer. The mix shall comply with the criteria in Table [719-3](#).

The mix design for PMTBRAC shall be prepared by a laboratory that is accredited through the AASHTO

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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 list of approved laboratories.

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.

Mix designs are subject to approval by the Engineer.

| TABLE 719-3 | | |
|---|--------------|----------------------------|
| MARSHALL MIX DESIGN CRITERIA | | |
| Criteria | Requirements | Designated Test |
| | 1/2” Mix | Method |
| 1. Binder Content, Minimum | 6.1% | --- |
| 2. Voids in Mineral Aggregate: %, min | 14 | AI MS-2 |
| 3. Effective Voids: %, Range | 4.0±0.2 | AI MS-2 |
| 4. Absorbed asphalt: %, Range* | 0-1.0 | AI MS-2 |
| 5. Dust to Eff. Asphalt Ratio, Range ** | 0.6-1.4 | AI MS-2 |
| 6. Tensile Strength Ratio: % Min. | 65 | ASTM D4867 |
| 7. Dry Tensile Strength: psi, Min. | 100 | ASTM D4867 |
| 8. Stability: pounds, Minimum | 2,500 | ASTM D6926 |
| 9. Flow: 0.01-inch, Range, Minimum | 8 | ASTM D6927 |
| 10. Mineral Aggregate Grading | --- | AASHTO T-27 & T11 |

* Unless otherwise approved by the Engineer.

** The ratio of the mix design composite gradation target for the No. 200 sieve, including admixture, to the effective asphalt content shall be within the indicated range