





Asphalt Mix Design and Acceptance 101
- Panel Discussion
February 20, 2020

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Colorado Procedure 52-20

- Why have a mix design?
 - The mix design is the basis for a quality project
 - Determines the appropriate blend
 - Assures that an asphalt pavement layer will perform as required
 - The mix design and subsequent Form 43 are the basis for:
 - Percent within limits acceptance
 - Incentive Payments



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- CDOT's guideline for mix design approval:

2020 CDOT FMM 7-01-2019 CP 52

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Standard Practice for
Contractor Asphalt Mix Design Approval Procedures

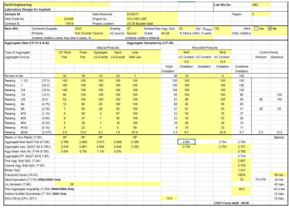
1. SCOPE
 - 1.1 This practice describes the procedures for asphalt mix design approval, the time required to perform the required tests, and the cost of the testing.

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Mix Design Submittal Requirements:

- At a minimum, cover letter must be stamped by a registered Professional Engineer in the State of Colorado (Sec 12-25-117 CRS)
- Must Provide Form #429 with mix design report (Electronic)
- Must receive approval prior to placement



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CP 52 Mix Design Requirements:

4. MIX DESIGN REQUIREMENTS


4.1 Labs and personnel providing asphalt mix designs shall comply with the requirements listed in CP 10.

4.2 Cover Letter – A cover letter including the following:

- Laboratory name & address
- Supplier's name & address
- Supplier's mix design number
- Date of trial batch testing
- Source of all mix design components
- Stamped & signed by a Professional Engineer registered in the State of Colorado

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Aggregate Requirements:

3.2.1 To verify the asphalt mix design, the aggregates to be used in the mix design, shall be sampled by the contractor in accordance with CP 30 and split in accordance with CP 32 in the presence of the Engineer. The split aggregates shall be tested by the Contractor and CDOT Central Laboratory Concrete/Physical Properties Unit. The aggregates shall be tested for: Gradation (CP 31), Aggregate Specific Gravity and Absorption, (AASHTO T 85 & CP-L 4102) and Plastic Index (AASHTO T 90). The Engineer will coordinate with the Region Materials Engineer to determine the need to run the Micro-Deval (CP-L 4211) and/or the Los Angeles Abrasion (AASHTO T 96).

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Aggregate Requirements:

4.3 It is recommended that a complete mix design consisting of test results from three trial blends (in accordance with Superpave Mix Design SP-2) be conducted when the materials sources used in the mix design have not been verified on past CDOT projects. A complete mix design must contain all of the following:

- (1) For each aggregate stockpile:
 - A. Aggregate source
 - B. Target gradation along with gradation results from at least the 10 most current samples taken during production. These samples shall have been sampled and tested within two months (see Note 2) of submitting the mix design.
 - C. Coarse Aggregate Bulk specific gravity and fine aggregate bulk specific gravity from at least the 3 most current samples taken during production. These samples shall have been sampled and tested within two months (see Note 3) of submitting the Mix Design.
 - D. Atterberg limits.
 - E. Los Angeles Abrasion.
 - F. Statistical data for the Apparent Specific Gravity and Bulk Specific Gravity.

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Aggregate Requirements, Continued:


(2) Reclaimed asphalt pavement (RAP) if used shall include the source and following statistical data from at least 10 samples tested within two months (see Note 2) of mix design submittal:

- A. Percent RAP Binder Content - AASHTO T-164, Method A or B, or CP-L 5120 if correction established per Revision of 401 - Reclaimed Asphalt Pavement.
- B. RAP Aggregate Gradation - CP 31.
- C. Effective Specific Gravity.
- D. Uniformity Calculations for the Processed RAP, to include Binder Content and Aggregate Gradation.

Note 2: The RAP aggregate bulk specific gravity will be back-calculated using an assumed average aggregate water absorption of 1.01%. The corresponding assumed aggregate asphalt absorption will be 0.61%.

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Aggregate Requirements, Continued:

Note 1: If the combined aggregate specific gravity of the contractor's asphalt mix design is not within 0.020 of the test results for the combined aggregates derived from the CDOT Central Laboratory testing as specified in Subsection 3.2.1, the Contractor and CDOT Central Laboratory shall both recheck calculations, retest, and/or resample/retest as needed until the resulting mix combined aggregate specific gravities agree to within 0.020. The contractor's aggregate specific gravity values will then be used to calculate the HMA mixture volumetric properties. At the discretion of the Region Materials Engineer, the use of the aggregate test results from the CDOT Central Laboratory as listed in Subsection 3.2.1 may be allowed for mix development only if all other mix design criteria are met when using Central Laboratories test results. The mix design criteria that must be met includes minimum VMA and VFA criteria and dust to asphalt ratio, as required by the Contract.

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