

Colorado Procedure 62-22

Standard Practice for

Contractor Concrete Mix Design Approval Procedure

1. SCOPE

1.1 This practice describes the procedures for concrete mix design approval.

2. APPROVAL OF CONCRETE MIX DESIGNS SUBMITTED TO A PROJECT

2.1 This process will be used for Project-specific concrete mix designs or concrete mix designs that are not on CDOT's Approved Products List (APL).

2.2 Concrete mix designs shall be performed in conformance with Colorado, AASHTO, and ASTM procedures.

2.3 The Contractor submits to the Project Engineer an electronic copy of the concrete mix design, which contains all the information detailed in Section 5, a minimum of three weeks before the anticipated concrete placement date. The Project Engineer will submit the Contractor's concrete mix design to the Concrete & Physical Properties (CPP) Unit primarily or the Region Materials Engineer (RME) for review and approval along with CDOT Form 1188 and an electronic copy of the Index Pages for the Project Special Provisions and Standard Special Provision.

2.3.1 All mix designs shall be stamped or electronically sealed by a registered Professional Engineer licensed in the State of Colorado according to Section 12-25-117 of the Colorado Revised Statutes. Copied or faxed mix designs will not be accepted. Scans of Wet-Stamped mix design submittals in pdf format are acceptable.

2.3.2 The CPP Unit or RME may verify any or all properties of the concrete mix design or individual component properties before mix design approval. The CPP Unit or RME will notify the Contractor that a mix design will be verified. The Contractor shall sample and submit the components to the CPP Unit or RME.

2.3.3 If requested, all worksheets and other supporting information shall be submitted to the CPP Unit or RME for their review before mix design approval.

2.4 If all tests conform to the specifications, a Concrete Mix Design Report (CDOT Form 1373) will be issued for the project.

2.4.1 A CDOT Form 1373 is only valid for the Project to which it was issued. If a concrete mix design is to be used on multiple Projects, the mix design, CDOT Form 1188, and a copy of the Project's Index of Special Provisions must be submitted for each Project. Concrete mixes approved for use on a project will remain valid for the life of the project, after the APL expiration date. The Project Engineer may direct the contractor to discontinue the use of a concrete mix.

2.5 When a standard mix design is approved by the CPP Unit the mix design will be placed on CDOT's APL. The Concrete Supplier may request a CDOT Form 1373 from the Project.

- 2.6 When the mix design is approved by the RME instead of the CPP Unit, the mix design will be forwarded to the CPP Unit for review.

3. USE OF PRE-APPROVED CONCRETE MIX DESIGNS ON PROJECTS

- 3.1 This process will be used when a contractor wants to use a pre-approved concrete mix design listed on CDOT's APL on a Project.
- 3.2 The Contractor shall submit to the Project Engineer a letter stating his intent to use a pre-approved concrete mix design. The letter shall state at a minimum, the Concrete Supplier, the supplier's mix design number, and CDOT's Concrete Mix Design Summary with mix design ID number, a minimum of one week before the anticipated concrete placement date.
- 3.3 The Project Engineer will submit a CDOT Form 1188 and a copy of the Project's Index of Special Provisions to the CPP Unit or RME.
- 3.4 If a pre-approved concrete mix design conforms to the Project's specifications, a Concrete Mix Design Report (CDOT Form 1373) will be issued for the project. Concrete mixes approved for use on a project will remain valid for the life of the project, after the APL expiration date. The Project Engineer may direct the contractor to discontinue the use of a concrete mix.
- 3.4.1 A CDOT Form 1373 is only valid for the Project in which it was issued.

4. PRE-APPROVAL OF CONCRETE MIX DESIGNS

NOTE 1: Mix designs are not required to be on the CDOT APL for them to be used on a Project.

- 4.1 This process will place a Concrete Supplier's concrete mix on CDOT's Approved Products List (APL). The APL is located at <https://www.codot.gov/business/apl/concrete-mix-designs>
- 4.1.1 Only standard mix designs will be placed on CDOT's APL. Project-specific mix designs such as Class D (special) will not be added to CDOT's APL. Concrete mix design approval will follow the procedures listed in Section 5.
- 4.2 Concrete mix designs shall be performed in conformance with Colorado, AASHTO, and ASTM procedures.
- 4.3 The Concrete Supplier submits to the CDOT Central Laboratory's Concrete & Physical Properties (CPP) Unit one copy of the concrete mix design, which contains all of the information detailed in Section 5.
- 4.3.1 All mix designs shall be stamped or electronically sealed by a registered Professional Engineer licensed in the State of Colorado according to Section 12-25-117 of the Colorado Revised Statutes. Copied or faxed mix designs will not be accepted.
- 4.3.2 The CPP Unit may verify any or all properties of the concrete mix design or individual component properties before mix design approval. The CPP Unit will notify the Concrete Supplier that a mix design will be verified. The Concrete Supplier will sample and submit the components to the CPP Unit.

- 4.3.3 If requested, all worksheets and other supporting information shall be submitted to the CPP Unit for their review before mix design approval.
- 4.4 If all tests conform to the specifications, the CDOT's Concrete Mix Design Summary with mix design ID number will be created and sent to the Concrete Supplier.
- 4.5 The approved mix design will be placed on CDOT's APL.
- 4.5.1 A concrete mix placed on the APL is not guaranteed to be approved for use on a particular Project.

5. CONCRETE MIX DESIGN REQUIREMENTS

- 5.1 Labs and personnel providing mix designs shall comply with the requirements listed in CP 10.
- 5.2 A concrete mix design shall contain the following information:
- 5.2.1 Cover Letter – A cover letter including the following:
- Laboratory name & address
 - Concrete supplier's name & address
 - Concrete supplier's mix design number
 - CDOT concrete class
 - Date of trial batch testing
 - Source of all mix design components
 - Stamped or electronically sealed & signed with a wet signature or electronically signed by a Professional Engineer registered and licensed in the State of Colorado.
- 5.2.2 Mix Design Sheet – A mix design sheet identifying the following:
- Name of the testing laboratory
 - Concrete supplier's name & address
 - Concrete supplier's mix design number
 - Components of the mix design:
 - Aggregates – Source, grading, and pit name
 - Cement – Source, type, and plant
 - Pozzolan – Source, class, and plant
 - Silica Fume – Source and plant
 - Admixtures – Source and type
 - Water – Source.
 - Mix design proportions and trial mix data per CDOT Standard Specification Section 601.05
 - Stamped or electronically sealed & signed with a wet signature or electronic signature by a Professional Engineer registered and licensed in the State of Colorado.
- 5.2.3 Appendix – An appendix shall include all supporting data and documentation required in Section 601.05. This shall include, but is not limited to aggregate data and certified test reports. Any test report or supporting documentation that is used in this report from sources not covered by the Engineer of Record shall be stamped or electronically sealed & signed with a wet signature or electronic signature by a Professional Engineer registered and licensed in the State of Colorado in charge of that work.

- 5.3 When the source of an admixture changes on pre-approved mix design, the Concrete Supplier shall submit a letter stamped or electronically sealed by the Concrete Mix Design Engineer approving the changes to the existing mix design to the CPP Unit. The letter shall list all mix designs that will be affected by the change. If the change is approved by the CPP Unit, the affected mix designs on the APL will be changed to reflect the new admixture source.

6. RECORD

- 6.1 The CPP Unit or RME will issue a CDOT Form 1373 to the Project Engineer. See Chapter 600 of the CDOT Field Materials Manual for an example.
- 6.2 The Project Engineer will supply the Contractor with the CDOT Form 1373 mix design number.
- 6.3 All requests for mix design information shall be made under the Colorado Open Records Act and shall follow CDOT Procedural Directives 25.1.

7. REMOVAL OF A MIX DESIGN FROM THE APL

- 7.1 The CPP Unit may elect to test any or all components of the mix design on the APL.
- 7.2 The CPP Unit will request that a Project sample the mix design constituents from the batch plant. The sample will be sent to the CPP Unit for testing.
- 7.3 When a material does not meet CDOT mix design specifications, the Concrete Supplier will be notified.
- 7.3.1 The material will be re-sampled by the Project and sent to the CPP Unit for retesting.
- 7.3.2 Upon a second failure, any mix design using the material will be removed from the APL.
- 7.3.3 The CPP Unit will send notice to the Region Materials Engineers that a mix design(s) have been removed from the APL and any Projects using the mix design(s) should discontinue their use.