November 7, 2018

REVISION OF SECTION 601
CLASS G CONCRETE

**NOTICE**

This is a standard special provision that revises or modifies CDOT’s *Standard Specifications for Road and Bridge Construction.* It has gone through a formal review and approval process and has been issued by CDOT’s Project Development Branch with formal instructions for its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by CDOT’s Standards and Specifications Unit. The instructions for use on CDOT construction projects appear below.

Other agencies which use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

**Instructions for use on CDOT construction projects:**

Use on projects where Class G shall be used to replace Class D concrete on all elements of new bridge structures that required Class D in the metro areas of Denver, Loveland, Ft Collins, Colorado Springs, Pueblo, Silverthorne, Glenwood Springs, Grand Junction, Montrose, Durango and Alamosa. Do not substitute Class BZ or S concrete with Class G concrete. Notes on the plan sheets calling out Class D for bridge concrete will need to be changed to Class G, or the project needs to create a project special stating that all Class D concrete on Structure(s) XX shall be Class G.

If you have a question whether or not the location of your project should use Class G, please contact the Concrete Unit within the Materials and Geotechnical Branch at DOT\_ConcreteMixDesigns@state.co.us .

November 7, 2018

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Section 601 of the Standard Specifications is hereby revised for this project as follows:

In subsection 601.02 add Class G to Table 601-1:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Concrete Class** | **Required Field Compressive Strength (psi)** | **Cementitious Material Content: Minimum or Range (lbs/yd3)** | **Air Content: % Range (Total)** | **Water/Cementitious Material Ratio: Maximum or Range** |
| **G** | 4,500 at 28 days | N/A | 5 – 8 | 0.45 |

In subsection 601.02 add Class G Concrete:

**Class G** concrete is a low shrinkage macro fiber-reinforced structural concrete. Class G concrete may be substituted for Class B or Class D concrete. Additional requirements are:

1. The concrete shall include a minimum of 4 pounds per cubic yard of Macro Fiber-Reinforcement.
2. Shrinkage reducing admixtures may be incorporated into the mix.
3. The unrestrained shrinkage shall be less than 0.030 percent when tested by CP-L 4103.
4. The permeability of the mix shall not exceed 2,500 coulombs at an age of not more than 56 days when tested in accordance with ASTM C1202.
5. The mix may contain more than 30 percent fly ash by weight of the total cementitious material.
6. The mix may use an optimized gradation. The mix shall have a nominal maximum aggregate size of ¾ inch if an optimized gradation is not used.
7. An expansive cement additive may be added to an ASTM C150 Type I/II cement and fly ash to produce an ASTM C845 Type K cement. Approximately 15 to 20 percent by weight of the cementitious content of the concrete will be the expansive cement additive. The proportion of the expansive cement additive will be determined by testing the cementitious material blend in accordance with ASTM C806. The blended material shall have an expansion of 0.04 to 0.10 percent at 7 days when tested in accordance with ASTM C806.

When an expansive cement is used the w/cm ratio shall be 0.45 to 0.55, and the expansion of the laboratory trial mix shall be 0.05 to 0.09 percent at 7 days when tested in accordance with ASTM C878.

Subsection 601.16 shall include the following after the second sentence of the first paragraph:

Class G concrete with an expansive cement shall be cured with the water cure method. The minimum curing period shall be 168 hours.

Delete subsection 601.17(g) and replace it with the following:

(g) W*ater to Cementitious Material Content (w/cm) Ratio.* When Class G concrete or a non-standard concrete is used the maximum w/cm ratio is the w/cm ratio that was used in the laboratory trial mix for the Concrete mix design except when an optimized gradation is the only deviation from the Standard Class B, Class BZ, Class D, Class DT, Class E, and Class P concrete requirements. The w/cm ratio shall be determined for each batch of non-standard concrete by the Contractor and provided to the Engineer for approval prior to placement. If an adjustment to the mix is made after the Engineer’s approval, the w/cm shall be determined and submitted to the Engineer prior to the continuation of placement. Any non-standard concrete that is placed without the Engineer’s approval shall be removed and replaced at the Contractor’s expense.