Pilot Project Special Provision: 601cgc

02/18/2016

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REVISION OF SECTION 601  
CLASS G CONCRETE

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:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **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 and Class D concrete. Additional requirements are:

1. 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 as determined by ASTM C1202.
5. If the mix contains more than 30 percent fly ash by weight of the total cementitious material, the salt scaling resistance of the trial mix shall be less than 3 as determined by ASTM C672.
6. The mix shall have a nominal maximum aggregate size of ¾ of an inch if an optimized gradation is not used.
7. The concrete mix may use an Optimized Gradation (OG). When an OG is used aggregate proportions must be a result of an optimized combined aggregate gradation (CAG) developed by an approved mix design technique such as Shilstone or KU Mix. The amount of aggregate in the CAG passing the 19 mm (¾ inch) sieve and retained on the12.5 mm (½ inch) sieve shall be a minimum of 8 percent for the trial mix design. The coarseness factor (CF) and workability factor (WF) must plot within the workability box (ABCD) depicted graphically by the following 4 coordinate points:
8. Point A> (CF,WF) 72, 31
9. Point B> (CF,WF) 44.5, 35
10. Point C> (CF,WF) 44.5, 43.5
11. Point D> (CF,WF) 72, 40

Figure 601-1



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CF = (S / T) x 100

Where:

S = Percent Cumulative Retained on 9.5 mm (3/8 inch) Sieve

T = Percent Cumulative retained on 2.36 mm (No. 8) Sieve

WF is the percent passing the 2.36 mm (No. 8) sieve. Increase workability factor by 2.5 percentage points for every 94 pounds per cubic yard of cementitious material used in excess of 564 pounds per cubic yard in the mix design. Decrease workability factor by 2.5 percentage points for every 94 pounds per cubic yard of cementitious material used below 564 pounds per cubic yard in the mix design. The Contractor shall not adjust the workability factor if the amount of cementitious material is 564 pounds per cubic yard.

1. 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 15-20 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 601.05 shall include the following in the second paragraph:

(8) Concrete with an OG shall indicate the gradation proportions that results in a combined aggregate gradation corresponding to compliance within the specified CF and WF box and shall include the following charts used to perform aggregate gradation analysis:

1. Coarseness Factor
2. Workability Factor
3. 0.45 power
4. Combined gradation

Delete Subsection 601.06 (10) and (11) and replace with the following:

(10) Weights of fine and coarse aggregates or combined weight when an OG is pre-blended

(11) Moisture of fine and coarse aggregates or combined moisture when an OG is pre-blended

Subsection 601.16 shall include the following:

1. Class G concrete with an expansive cement shall be cured as follows:

Water Cure Method. The water cure method shall be applied as soon as it can be without marring the surface. The surface of the concrete, including bridge curbs and bridge sidewalks, shall be entirely covered with wet burlap and polyethylene sheeting. Prior to being placed, the burlap shall be thoroughly saturated with water. The wet burlap and polyethylene sheeting shall extend at least twice the thickness of the bridge deck beyond the edges of the slab and shall be weighted to remain in contact with the surface. The wet burlap and polyethylene sheeting shall remain in contact and be kept wet for the entire curing period

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REVISION OF SECTION 601  
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Subsection 601.17 shall include the following:

(g) W*ater to cementitious material content (w/cm) ratio.* For Class G concrete the maximum w/cm ratio is the w/cm ratio that was used in the in the laboratory trial mix for the Concrete Mix Design. The w/cm ratio shall be determined for each batch of Class G 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 Concrete Class G concrete that is placed without the Engineer’s approval shall be removed and replaced at the Contractor’s expense.

**INSTRUCTIONS TO DESIGNERS:**

**Use in conjunction with the standard special provision, Revision of Section 601, Fiber Reinforced Concrete**