**Notice**

This Project Special Provision (PSP) revises or modifies CDOT’s Standard Specifications for Road and Bridge Construction. These are the official instructions for its use on CDOT construction projects, and have been reviewed, approved, and issued by the Construction Engineering Services Branch. Use as written without change. Do not use modified versions of this PSP on CDOT construction projects. Do not use this special provision on CDOT projects in a manner other than specified in the instructions without approval by CDOT’s Standards and Specifications Unit. The instructions for use appear below.

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

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

Use in projects with Concrete Pavement Repair or Rehabilitation Activities.

Typically PCCP repair can be completed with Class P (fast track) but when the lane closure policy limits the amount of time a lane can be closed. This provision is for use when lane closures are limited to 8 hours or less or when concrete is required to achieve a compressive strength of 2,500 psi in 6 hour or less. When these criteria are required, specify Class PRS Concrete instead of Class P (fast track). When these criteria are not met, specify Class P (fast track), however include this Project Special Provision to allow the Contractor the option to substitute Class PRS concrete for Class P.

**Revision of Sections 601, 701 & 711**

**Accelerated Pavement Repair Concrete**

**Revise Section 601 of the Standard Specifications for this project to include the following:**

**Description**

**601.26** This work consists of furnishing and placing accelerated pavement repair concrete on existing pavements in accordance with these specifications and in conformity with the lines, grades and dimensions as shown on the plans or established.

**Materials**

**601.27** The accelerated pavement repair concrete shall be designated as Class PRS (Class P rapid strength).

| **Concrete Class** | **Required Field Compressive Strength (psi)** | **Air Content: % Range (Total)** | **Slump** | **Maximum Water/Cementitious** **Material Ratio:** |
| --- | --- | --- | --- | --- |
| **PRS** | 4500 at 28 days | 4 - 8 | +/- 2” of Form 1373 Slump | w/cm on Form 1373 |

**Class PRS** concrete is used for concrete pavement rapid repairs. Class PRS may be substituted for Class P concrete when approved by the Engineer. Additional requirements are:

1. ASTM C1600 rapid hardening hydraulic cement shall be used.
2. Set-retarding admixtures such as citric acid or those meeting the requirements of AASHTO M194 may be used.
3. The unrestrained shrinkage shall not exceed 0.050 percent at 28 days when tested by CP-L 4103.
4. The mix shall either have a permeability not exceeding 2,500 coulombs at an age of not more than 56 days when tested in accordance with ASTM C1202, or have a surface resistivity of at least 12 kΩ-cm at 28 days using AASHTO T358.
5. The mix shall consist of a minimum 55 percent AASHTO M 43 sizes No. 57, No. 6, No. 67, No. 357, or No. 467 coarse aggregate by weight of total aggregate.
6. The mix may use an OG with a nominal maximum aggregate size of at least ¾ inch.

**601.28 Mix Design Submittal Requirements.** Mix design submittals shall meet the requirements of subsection 601.05 with the following additional requirements.

1. Class PRS concrete shall include CP-L 4103 shrinkage test results at 4 hours, 24 hours, 7 days, and 28 days.
2. Class PRS concrete shall include a report of maturity relationships in accordance with CP 69.
3. Class PRS concrete shall include AASHTO T97 (ASTM C78) Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading). At least two specimens will be tested at 7 days and four specimens at 28 days. The lab trial mix shall produce a flexural strength of at least 650 psi at 28 days
4. Aggregate used for Class PRS concrete will require ASTM C1567 test results with the mix design cement and aggregates. 14-day expansion shall be 0.10% or less.

Mix designs for Class PRS Concrete are approved for one year from date of the trial mix. When a Self-Contained Mobile Mixer (volumetric mixer truck) is used on the Project, the trial mix shall be performed with the volumetric mixer truck.

1. **29 Batching.** Batching shall meet the requirements of subsection 601.06
	1. **Mixing.** Mixing shall meet the requirements of subsection 601.06.

When a Self-Contained Mobile Mixer (Volumetric truck) is used for Class PRS concrete, the requirements of sub-section 601.06 (d) with the following shall be met:

1. When ice is used to cool the mix water, it must be melted before entering the mixer.

**601.31 Placing.** Placing shall meet the requirements of Section 412 with the following additional requirements:

*(a)* **General.** A pre-pour meeting with the Contractor, sub-contractor, material supplier and Department personnel shall be held prior to Class PRS concrete placement to discuss the following:

1. Concrete curing.
2. Concrete protection.
3. Washout bin staging.
4. Handling of concrete cylinders.
5. Placement of maturity probes.
6. Hot Weather placements.
7. Cold weather placements.
8. Opening to traffic.
9. Class PRS concrete placement may occur when the concrete temperature is between 50 and 80 degrees F, when tested immediately after discharge from chute
10. *Curing****.*** Curing shall be applied immediately following finishing operations. Curing compound manufacturer recommended application rates shall be followed, with a minimum rate of 200 SF/Gal. Curing Compound shall be an approved ASTM C 309, Type 2, Class B.
11. *Hot Weather Limitations.* A plan shall be submitted for approval prior to any placement when air temperature is expected to exceed 80 F. Procedures for maintaining and monitoring of temperatures of water, aggregates and admixtures during mixing, placement and curing of concrete shall be detailed as well as procedures to be implemented upon abrupt changes in weather conditions. Placing of concrete during hot weather shall be limited by the temperature of the concrete at the time of placing. Class PRS concrete which has a temperature of 80 F or higher, shall not be placed.
12. *Cold Weather Limitations.* When the ambient temperature is forecast to drop below 40 degrees F during placement and up to 24 hours after placement a plan shall be submitted for approval prior to any placement. Procedures for maintaining and monitoring of temperatures of water, aggregates and all other admixtures during mixing, placement and curing of concrete shall be detailed as well as procedures to be implemented upon abrupt changes in weather conditions. Concrete shall not be placed on frozen subgrade.

**601.32 Finishing.** During finishing of Class PRS concrete, water and finishing aids shall not be added or worked into the surface. The surface texture of the Class PRS concrete shall match the texture of adjacent concrete pavement. The finished transverse and longitudinal surface elevation of the pavement shall be measured using a 10-foot straightedge. Areas to be measured will be directed by the Engineer. The Contractor shall furnish an approved 10-foot straightedge, depth gauge, and operator to aid the Engineer in testing the pavement surface. Areas showing high spots of more than 3/16 inch in 10 feet shall be marked and diamond ground until the high spot does not exceed 3/16 inch in 10 feet. Areas in a lane with more than 250 continuous feet of paving or diamond grinding in the direction of traffic, the surface texture will be considered acceptable when the average texture depth (ATD) of the panel is greater than 0.05 inch. The Contractor will perform surface texture testing in accordance with CP 77 Method B. Areas in a lane with more than 250 continuous feet of paving will be tested at a frequency of one test per 250 linear feet. Areas with deficient surface texture shall be diamond ground and retested.

**601.33 Opening to Traffic.** The pavement shall not be opened to traffic until the concrete has achieved a compressive strength of at least 2500 psi. Concrete compressive strength shall be determined by a maturity meter placed no more than 10ft from the end of the final placement of the shift. The contractor shall provide maturity meters and all necessary wires and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meters and wires. For placements with multiple maturity meters, the lowest compressive strength shall determine when the pavement may be opened to traffic. Prior to opening the pavement to traffic the roadway shall be cleaned.

**601.34 Acceptance and Pay Factors.** Class PRS concrete will be accepted following the requirements of subsection 601.17 with the following exceptions:

1. Compressive strength specimens shall be cast and initially cured at the placement location for at least 4 hours. Compressive strength specimens shall be moved prior to opening to traffic.
2. Slump testing will not be used for acceptance.

**Revise Subsection 701.01 of the Standard Specifications for this project to include the following:**

Cement for Class PRS concrete shall meet the requirements of ASTM C1600. ASTM C1600 cements shall have an expansion of 0.05% or less at 6 months or 0.10% or less at 12 months.

**Revise Subsection 711.03 of the Standard Specifications for this project to include the following:**

Citric acid for use in Class PRS concrete shall be provided in liquid form with 49-52% solids.