

## 901-R-627 PCC AND BLENDED CEMENTS

(Revised 06-16-16)

The Standard Specifications are revised as follows:

SECTION 501, BEGIN LINE 146, DELETE AND INSERT AS FOLLOWS:

Fly ash or GGBFS used as an additive, or blended ~~portland~~ cements may only be incorporated in the concrete mix between April 1 and October 15 of the same calendar year. If type IP, type IP-A, type IS or type IS-A cements are to be used, the minimum portland cement content shall be increased to 500 lbs/cu yd. The use of fly ash or GGBFS as an additive will not be allowed when blended ~~portland~~ cements *types IP, IP-A, IS, or IS-A* are used.

SECTION 502, BEGIN LINE 85, DELETE AND INSERT AS FOLLOWS:

Fly ash or GGBFS used as an additive, or blended ~~portland~~ cements may only be incorporated in the concrete mix between April 1 and October 15 of the same calendar year. If type IP, type IP-A, type IS or type IS-A cements are to be used, the portland cement content shall be increased to 598 lbs/cu yd. The use of fly ash or GGBFS as an additive will not be allowed when blended ~~portland~~ cements *types IP, IP-A, IS, or IS-A* are used.

SECTION 502, BEGIN LINE 102, INSERT AS FOLLOWS:

Minimum portland cement content (types I, <i>IL</i> or III).....	564 lbs/cu yd
Maximum fly ash addition .....	10% of cement content
Maximum water/cementitious ratio (types I or <i>IL</i> ).....	0.42

SECTION 702, BEGIN LINE 67, INSERT AS FOLLOWS:

**702.05 Proportioning**

*Control of PCC for air content, slump, or relative yield will be determined on the basis of tests performed by the Engineer. Concrete and necessary labor for sampling shall be furnished by the Contractor as required by the Engineer. Testing will be in accordance with the Frequency Manual.*

*A CMDS shall be submitted seven calendar days prior to production and be approved by the Engineer except utilization of the Department provided spreadsheet is not required for the CMDS. The absolute volume of the mix design shall be 27.0 cu ft at the design air content of 6.5%.*

The proportion of ingredients of each batch shall be within the following limits, and shall be approved.

SECTION 702, BEGIN LINE 82, INSERT AS FOLLOWS:

Fly ash from an approved source may be used as a partial replacement for portland cement. The substitution of fly ash for portland cement will not be allowed in conjunction with the use of ~~blended portland cement~~ or ground granulated blast furnace slag or *blended cement types IP, IP-A, IS, or IS-A*. Mix designs will be based on using a maximum 20% cement reduction with a minimum 1.25:1 ash-to-cement replacement ratio by weight.

Ground granulated blast furnace slag from an approved source may be used as a partial replacement for portland cement. The substitution of ground granulated blast furnace slag for portland cement will not be allowed in conjunction with the use of blended portland cement *types IP, IP-A, IS, or IS-A* or fly ash. Mix designs will be based on using a maximum 30% cement substitution with a 1:1 slag-to-cement ratio, by weight.

SECTION 702, BEGIN LINE 103, DELETE AS FOLLOWS:

~~When fly ash or ground granulated blast furnace slag is used, an acceptable concrete mix design shall be submitted. Fly ash or ground granulated blast furnace slag and all other material sources proposed for portland cement concrete mix designs shall be furnished at least 15 days prior to the initiation of work. Prior to use, it shall be demonstrated by trial batch that the concrete mix design will produce concrete complying with all requirements. A concrete mix design will not be considered approved until this trial batch demonstration is successfully completed, including flexural strength data. The required minimum 550 psi flexural strength shall be obtained at an age consistent with the contract work schedule, but not to exceed 28 days.~~

~~Once a mix design has demonstrated for the contract that the concrete mix design with a specific fly ash source or a specific ground granulated blast furnace slag source produces a concrete which is in accordance with the mix design requirements, further trial batch demonstration will be at the Engineer's discretion for this contract and subsequent contracts.~~

~~All concrete shall have an air content of 6.5% ± 1.5% by volume. Air content shall be determined in accordance with 505. When fly ash is used, the first concrete truck on the contract will be tested by the Department for complete compliance with plastic concrete requirements for air content, slump, and yield. If not in complete compliance, the concrete will be rejected and no further concrete with fly ash in it will be considered on the contract until it is demonstrated by an additional trial batch that the concrete mix design, or modification thereof, complies. All demonstration testing shall be conducted by the Contractor. During the placement of concrete containing fly ash, the air content of the concrete shall be determined to be at least equal to the testing requirements set out in the Department's Manual for Frequency of Sampling and Testing and Basis for Use of Materials. Additional testing may be required, as conditions warrant. All such air content testing of the concrete shall be performed by a certified technician. A certified technician must have successfully completed a concrete course offered by the Department's Human Resources Division, the National Ready Mix Concrete Association, the American Concrete Institute, or approved equal.~~

~~Portland cement concrete with fly ash or ground granulated blast furnace slag which does not consistently comply with Department concrete requirements will be grounds for rejection of its further use. In the event of such a rejection of further use, all unsatisfactory work shall be corrected with no additional payment and the contract shall be completed using portland cement without fly ash or ground granulated blast furnace slag.~~

SECTION 901, BEGIN LINE 22, INSERT AS FOLLOWS:

**(b) Portland Cement**

Portland cement shall conform to the requirements of the following cited

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specifications except as noted.

**1. Requirements**

<b>Cement</b>	<b>Specifications</b>
Air-Entraining Portland Blast-Furnace Slag Cement .....	AASHTO M 240, Type IS-A
Air-Entraining Portland Cement .....	AASHTO M 85, Type IA or IIIA
Air-Entraining Portland-Pozzolan Cement .....	AASHTO M 240, Type IP-A
Portland Blast-Furnace Slag Cement .....	AASHTO M 240, Type IS
Portland Cement.....	AASHTO M 85, Type I, II, or III
<i>Portland-Limestone Cement</i> .....	<i>AASHTO M 240, Type IL</i>
Portland-Pozzolan Cement.....	AASHTO M 240, Type IP
<del>Slag Modified Portland Cement.....</del>	<del>AASHTO M 240, Type ISM</del>

SECTION 901, BEGIN LINE 286, DELETE AND INSERT AS FOLLOWS:

**1. Requirements**

The ground granulated blast furnace slag shall be in accordance with ASTM C 989 for grade 100 or 120.

For each ~~2,000~~2,500 t produced, a complete ASTM C 989 analysis shall be performed on a sample composited randomly from the daily samples. The method of randomization shall be subject to approval by the Department.