

ITEM 18555.96 M - CONCRETE FOR STRUCTURES, CLASS HP

DESCRIPTION. This work shall consist of furnishing and placing portland cement concrete for structures as indicated on the plans or as ordered by the Engineer. The concrete shall contain fly ash and microsilica.

MATERIALS. All the material requirements of §555-2 shall apply. In addition, the microsilica admixture shall be supplied in either a densified powder or slurry form.

The microsilica admixture shall be one appearing on the Department's Approved List. Only one brand shall be allowed for any structural element. The Manufacturer shall provide written certification that the supplied material meets the requirements of the procedural directives of the Materials Bureau. For each shipment supplied this certification shall list fineness, silica content, total chloride ion content, solids content for slurries, and moisture content for densified powders. Additionally, the Regional Materials Engineer shall take a minimum sample of one liter directly from the storage container, for each days placement of Class HP concrete, for testing by the Department.

If the microsilica admixture is supplied in the slurry form the slurry shall be maintained in storage above the temperature of 0°C. Slurries exposed to temperatures of 0°C or less shall be removed and replaced at no cost to the Department. The slurry shall be homogeneous and agitated as necessary to prevent separation.

Class HP concrete shall consist of a homogeneous mixture of cement, fly ash, microsilica admixture, fine aggregate, coarse aggregate, air entraining agent, set retarding water reducing admixture and water which meets the requirements of the MIX CRITERIA table given below.

MIX CRITERIA

Cement content (kg/m ³)	300
Fly ash content (kg/m ³)	80
Microsilica content (kg/m ³)	25
Sand percent total aggregate (solid volume)	40
Designed water/total cementitious content of 400.3 kg	0.40
Desired air content (%)	6.5
Allowable air content (%)	5.0 - 8.0
Desired slump (mm)	90
Allowable slump (mm)	75 - 100
Type of coarse aggregate gradation	CA 2

NOTE The criteria are given for design information and the data is based on a fine aggregate fineness modulus of 2.80. The mixture proportions shall be determined using actual conditions for fineness modulus and bulk specific gravities (saturated surface dry for aggregate). The proportions shall be computed according to Department written instructions.

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The requirements of §501 shall apply, except as modified herein.

1. If a densified powder is used, the mass of the densified powder shall be measured cumulatively with the cement and fly ash. The densified powder shall be last in the measuring sequence and the tolerance for each material draw mass shall be based upon the total mass of cement plus fly ash plus densified powder. The batching tolerance for the cement plus fly ash plus densified powder shall be $\pm\frac{1}{2}\%$ by mass.
2. If a microsilica slurry is used, the slurry shall be added using proportioning equipment approved by the Regional Materials Engineer. The microsilica slurry admixture shall be added through an existing automation system or a two stop off-line automated batching system. The automated batching system shall meet the following requirements:

Delivery accuracy of $\pm 1\%$ (by volume)

Program quantity (liters, nearest tenth)

Batching tolerance $\pm 2.0\%$ (by volume)

System interlocks

Print requirements:

- a. Date and time
- b. Truck number (or alternate method relating microsilica to batch ticket)
- c. Delivered quantity (liters, nearest tenth)

The control box/printer for a two stop off-line batching system shall be located at the batch plant operator's work station unless otherwise approved by the Regional Materials Engineer.

Calibration shall be in accordance with the procedures approved by the Regional Materials Engineer. Whenever any part or all of the off-line system is moved the entire system shall be recalibrated.

CONSTRUCTION DETAILS. All the provisions of §555-3 shall apply.

METHOD OF MEASUREMENT. All the provisions of §555-4 shall apply.

BASIS OF PAYMENT. All the provisions of §555-5 shall apply.

Payment will be made under:

Item No.	Item	Pay Unit
18555.96 M	Concrete for Structures, Class HP	Cubic Meter