MIXTURE DESIGNATION:

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| **Cementitious Materials** |
| ***Component*** | ***Specific Gravity*** | ***Volume (ft3)***  | ***Amount of CM (mass/volume) (lb/yd3)*** |
| *Cement, ASTM Type* |  |  |  |  | *Total Amount of cementitious materials****\_\_\_\_\_\_\_*** *lb/yd3**c/cm ratio****\_\_\_\_\_\_\_*** |
| *Cementitious Material 1* |  |  |  |  |
| *Cementitious Material 2* |  |  |  |  |  |
| *Cementitious Material 3* |  |  |  |  |
| **Fibers** |  |
| ***Component*** | ***Specific Gravity*** | ***Volume (ft3)*** | ***Amount of Fibers (mass/volume) (lb/yd3)*** |
| *Fiber 1* |  |  |  |  | *Total Amount of Fibers**\_\_\_\_\_\_\_ lb/yd3* |
| *Fiber 2* |  |  |  |  |
| **Aggregates** |
| ***Aggregates*** | ***ASTM******C330\**** | ***Abs (%)*** | ***SGOD*** | ***SGSSD*** | ***Base Quantity (lb/yd3)*** | ***Volume (ft3)*** |
| ***OD***  | ***SSD*** |
| *Aggregate 1* | Y / N |  |  |  |  |  |  |
| *Aggregate 2* | Y / N |  |  |  |  |  |  |
| *Aggregate 3*  | Y / N |  |  |  |  |  |  |
| **Admixtures** |
| ***Admixture*** | ***lb/gal*** | ***Dosage*****(*fl. oz / cwt)*** | ***% Solids*** | ***Amount of Water in Admixture (lb/yd3)*** |
| *Latex (if used)* |  |  |  |  | *Total Water from* *Admixtures, ∑wadmx****\_\_\_\_\_\_\_*** *lb/yd3* |
| *Liquid Dye (if used)* |  |  |  |  |
| *Admixture*  |  |  |  |  |
| *Admixture*  |  |  |  |  |
| **Solids (latex, dyes and powdered admixtures only)** |
| ***Component*** | ***Specific Gravity*** | ***Volume (ft3)*** | ***Amount (mass/volume) (lb/yd3)*** |
| *Latex (if used)* |  |  |  | *Total Solids from* *Admixtures****\_\_\_\_\_\_\_*** *lb/yd3* |
| *Liquid Dye (if used)* |  |  |  |
| *Powdered Admixture*  |  |  |  |
| **Water** |
|  | ***Amount (mass/volume) (lb/yd3)*** | ***Volume (ft3)*** |
| *Water, lb/yd3*  |  | *w*: |  |
| *Total Free Water from All Aggregates, lb/yd3* | *∑wfree*: |  |
| *Total Water from All Admixtures, lb/yd3* | *∑wadmx*: |
| *Batch Water, lb/yd3*  | *wbatch*: |
| **Densities, Air Content, Ratios and Slump** |
|  | ***cm*** | ***fibers*** | ***aggregates*** | ***solids*** | ***water*** | ***Total*** |
| ***Mass of Concrete, M, (lb )*** |  |  |  |  |  |  *∑M:* |
| ***Absolute Volume of Concrete, V, (ft3)*** |  |  |  |  |  |  *∑V:* |
| ***Theoretical Density, T,*** *(=∑M / ∑V)* | *lb/ft3* | ***Air Content*** *[= (T – D)/T x 100%]* | *%* |
| ***Measured Density, D*** | *lb/ft3* | ***Slump, Slump flow*** | *in.* |  |
| ***water/cement ratio, w/c:*** |  |  | ***water/cementitious material ratio, w/cm:*** |  |  |

\* *Indicate if aggregate, other than manufactured glass microspheres and/or cenospheres, is compliant with ASTM C330.*

**Terms and Formulas for Table 3.1**

***Abs*** = absorption of an aggregate, whether taken as a whole, the coarse, or the fine aggregate, %.

***cwt***  = hundred weight of cementitious material (example 860 lb/yd3 of cm is 8.6 cwt)

***MCtotal*** = total moisture content referenced to the oven-dried condition of the aggregate, %.

***MCfree*** = free moisture content, referenced to the saturated, surface-dry condition (SSD), of the aggregate, %.

***MCstk*** = stock moisture content of the aggregate, %.

***M*** = the measured density (wet, plastic) of concrete test cylinders, per ASTM C138, lb/ft3.

***T*** = the theoretical density of concrete (zero air voids), per ASTM C138, lb/ft3.

***SGSSD*** = specific gravity, in the saturated, surface-dry condition, of aggregate, dimensionless.

***SGOD*** = specific gravity, in the oven-dried condition, of aggregate dimensionless.

***WSSD*** = mass, in the saturated, surface-dry condition, of aggregate per unit volume of concrete, lb/yd3.

***WOD*** = mass, in the oven-dried condition, of aggregate per unit volume of concrete, lb/yd3.

***Wstk*** = mass, in the stock moisture condition, of the aggregate per unit volume of concrete, lb/yd3.

***wadmx*** = the mass of water in the admixtures, per unit volume of concrete, lb/yd3.

***wbatch*** = the mass of water to be batched per unit volume of concrete when the aggregates are in a stock moisture condition, lb/yd3.

***wfree*** = free water carried into the batch by a wet per unit volume of concrete, lb/yd3.

***Each one of these formulas should be applied to each aggregate source:***











Note that *wfree* can be a negative number indicating a dry and absorptive aggregate.

*Wstk = WSSD + wfree*

Then, for the mixture as a whole: 

***The following formula should be applied to all admixtures in liquid form:***

*wadmx* *= dosage (fl oz/cwt) \* cwt of cm \* water content (%) \* 1 gal/128 fl oz \* lb/gal of admixture*

***The following formula should be applied to latex and liquid dyes, only:***

*S = dosage (fl oz/cwt) \* cwt of cm \* solid content (%) \* 1 gal/128 fl oz \* lb/gal of admixture*