

D.13 CONCRETE MIX DESIGN

Having the proper design mix of the concrete you place in your PolySteel walls is critical to the success of both the construction and performance of the walls in your project. We strongly recommend that you consult with your concrete supplier in advance to ensure that your objectives are met and to establish a relationship that will benefit this and all future PolySteel projects. The following guidelines have been prepared as a guide to ordering concrete from either a quality-controlled, performance design mixing concrete plant, or a small facility that may not have a standard design mix which meets the Mix Design Guidelines specified below.

D.13.1 DESIGN GUIDELINES

The following mix design guidelines should be used when ordering concrete from a ready-mix concrete plant that has a Quality Assurance or Quality Control Department and knows about how to achieve the design required with the local materials available.

Concrete Strength	(f'c') = 2,500 psi at 28 days
Course Aggregate a. 100% passing the 1/2" screen b. 85-100% passing the 3/8" screen	ASTM C-33 #8
Fine Aggregate	ASTM C-3
Fly Ash (Class F or Class C)	Recommended up to 30%
Water Reducers/Plasticizers	May be used as recommended by supplier
Slump	5 to 6 inches out of the pump

Notes:

1. Specifications of mix material and properties are encouraged.
2. Mix design stamped by a professional engineer is encouraged.
3. Entrained air can be used to improve workability.
4. DO NOT add calcium under any circumstances.
5. Ask supplier to come by and do a quality control check on the mix. Many times there is no charge for this. If they have a lab, see if they will test the cylinders if you will make them up. If the tests show that the psi is much higher than required, you may be able to reduce the cement content next time.



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D.13.2 MIX DESIGN

The following mix design should be used when ordering concrete from a ready-mix plant that does not have a standard design mix to meet the guidelines in D.13.1 above. Depending on the type of material and individual gradation, these ratios may have to be adjusted. Consult with the local supplier, and consider the pump that will be utilized to help determine the proper mix to achieve the slump required.

Concrete Strength (f'c) = 2,500 psi	With Fly Ash	Without Fly Ash
Cement	5.0 bags (470 lbs.)	6.0 bags (564 lbs.)
Fly Ash (1)	1.5 bags (141 lbs.)	0
Course Aggregate - Less than 1/2"	1,270 lbs	1,270 lbs
Fine Aggregate (sand - FM 3.70) (2)	1,620 lbs.	1,620 lbs.
Water (3)	40 - 46 gallons	40 - 46 gallons
Entrained Air (4)6% or 1 oz. per bag	6% or 1 oz. per bag	
Water reducer	As Recommended	As recommended

Notes:

1. The use of Fly Ash improves the flowability of the concrete, reduces the amount of Portland cement required (saving you money), and utilizes a byproduct of the power-generating utility that would otherwise require disposal (saving the environment). The ability to use fly ash in PolySteel Forms improves the contribution you can make to the LEED certification program and to "Building A Better World."
2. FM is the Fineness Modulus for sand.
3. CAUTION: Adding one gallon of water per yard of concrete will reduce the compressive strength by 200 psi. Be cautious about the amount of water added to the mix.
4. 6% Entrained Air results in better flowing concrete.

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