
Supplemental Technical Specification for

Flowable Fill

SCDOT Designation: SC-M-210 (06/11)

1. SCOPE

- 1.1. This work consists of furnishing flowable fill as an alternate to compacted soil as approved by the Resident Engineer. Applications for this material include beddings, encasements, and closures for tanks and pipe, and general backfill for trenches and abutments.

2. REFERENCED DOCUMENTS

- 2.1. SCDOT Standard Specification Section 210
- 2.2. SCDOT Standard Specifications Division 700
- 2.3. SCDOT Qualified Product Lists 1, 3, 5, 6, 28, and 31.

3. SUBMITTALS

- 3.1. Provide mix designs for review to the Structural Materials Engineer at the Office of Materials and Research (OMR) at least 14 days prior to need. Provide copies of mix designs being submitted for review to the Resident Engineer.

4. MATERIALS

- 4.1. Use materials that meet the requirements of Division 700 of the Standard Specifications with the following exceptions:
 - 4.1.1. *Fine Aggregate* – Any clean fine aggregate from an SCDOT-approved source, as shown on Qualified Product List 1, with 100% passing a 3/8 sieve and no more than 15% passing a No. 200 sieve may be used. Other fine aggregate gradations requirements are waived.
 - 4.1.2. *Air Entraining Admixtures* – High air generators or foaming agents as shown on Qualified Product List 31 may be used. Admixtures as given on Qualified Product List 5 are also approved for use in flowable fill.

5. DELIVERY, STORAGE, AND HANDLING

- 5.1. All delivery, storage, and handling requirements are as given in Division 700, except that the revolution counter requirements are waived. Deliver flowable fill using concrete construction equipment. Place flowable fill by chute, pumping, or other methods approved by the Resident Engineer. When placing through water, tremie flowable fill.

6. MIX DESIGN

- 6.1. Flowable fill will consist of a mixture of Portland cement, fly ash, fine aggregate, air entraining admixture, and water. Flowable fill is intended to contain a low cementitious content for reduced strength development.
- 6.2. Flowable fill is available in either Excavatable or Non-Excavatable proportions as specified by the Resident Engineer. The following table lists mix design proportion ranges for both types of flowable fill.

Table 1 – Mix Designs for Flowable Fill			
	Excavatable		Non-Excavatable
	Air Entrained	Non-Air Entrained	
Type 1 Portland Cement*	50-100 lbs/yd ³ **	20-40 lbs/yd ³	75-150 lbs/yd ³
Fly Ash	0-600 lbs/yd ³	250-600 lbs/yd ³	150-600 lbs/yd ³
Water	See Note 1.	See Note 1.	See Note 1.
Air***	15-35%	Not applicable	5-20%
28-day Compressive Strength***	150 psi Maximum	150 psi Maximum	150 psi Minimum
Unit Weight (Wet)***	90-100 lbs/ft ³	Not applicable	100-125 lbs/ft ³

Note 1. – Select water content as necessary to produce a consistency that will result in a flowable, self-leveling product at the time of placement.

*Other types of Portland cement meeting the requirements of Division 700 may be used with prior approval of the Structural Materials Engineer.

**When using less than 75 lbs/yd³ of Portland cement, the combined quantity of Portland cement and fly ash must be at least 100 lbs/yd³.

***The requirements for air, 28-day compressive strength, and unit weight are for laboratory design only and are not jobsite acceptance requirements.

- 6.3. When low density flowable fill is specified, use an approved high air generator or foaming agent as given in Qualified Product List 31 and the following mix proportions:

Table 2 – Mix Designs for Low Density Flowable Fill	
Type 1 Portland Cement*	60 lbs/yd ³ Minimum
Air**	20-40%
28-day Compressive Strength**	50 to 145 psi
Unit Weight (Wet)**	Less than 90 lbs/ft ³

*Other types of Portland cement meeting the requirements of Division 700 may be used with prior approval of the Structural Materials Engineer.

**The requirements for air, 28-day compressive strength, and unit weight are for laboratory design only and are not jobsite acceptance requirements.

Because of its high air content, the ability to pump low density flowable fill while maintaining the required air content is limited. Ensure that the flowable fill supplier is aware of any planned pumping of this material well in advance of placement.

- 6.4. Flowable fill may also be specified as Rapid Set (RS) or Normal Set (NS). A minimum compressive strength of 35 psi is required at 16 hours for Type RS or at 48 hours for Type NS when cured under standard laboratory conditions. Report the laboratory compressive strength at these times as part of the mix design submittal.

7. ACCEPTANCE

- 7.1. Prior to construction, the Structural Materials Engineer at OMR must have appropriately reviewed the mix design.
- 7.2. Furnish a delivery ticket to the Resident Engineer for each load of flowable fill delivered to the work. Ensure that each ticket contains the following information:
 - Project designation
 - Date
 - Time
 - Class and quantity of flowable fill
 - Quantity of water withheld