

Suggested Specification for Ready-Mixed Flowable Fill

This suggested specification is based on the facts, tests, and authorities stated herein. It is intended for the use of professional personnel competent to evaluate the significance and limitations of the reported findings and who will accept responsibility for the application of the material it contains. All responsibility for application of the stated principles or for the accuracy of any of the sources is disclaimed. No responsibility is accepted for any work performed with reference to this suggested specification. This suggested specification is based on the Suggested Specification for Ready-Mixed Flowable Fill produced by the Virginia Ready-Mixed Concrete Advisory Council.

FF.-1. General Conditions

1.1. The general conditions of the contract and the supplemental general conditions bound herewith are part of this specification. The contractor shall consult all conditions in detail for instructions pertaining to work under the contract.

FF.-2. Scope of Work

2.1. The contractor shall furnish all labour, materials, equipment and services required to place all flowable fill in designated areas where shown on drawings and specified herein.

2.2. The contractor is responsible for identifying the intended application and identify those areas which are excavatable and non-excavatable.

FF.-3. Definitions

3.1. "Approved"-Approved or permitted by the engineer, or other authorised representative of the owner.

3.2. "Project drawings"-All drawings that accompany this specification and complete and outline the boundaries for placement of flowable fill.

3.3. "Flowable-Fill" -As described in the American Concrete Institute's (ACI) Committee 229 report, it is a Controlled Low Strength Material (CLSM) used as primary backfill or alternate to standard soil or stone backfill. Flowable fill differs from Portland Cement Concrete as it contains a low cementitious content to reduce strength developments for possible future removal.

3.4. "Excavatable"-An application where it may be necessary to remove the flowable fill at a later date.

3.5. "Non-Excavatable"-An application where it is not necessary to remove or otherwise excavate the flowable fill at a later date.

FF.-4. Applications

4.1. Backfill (Sewer Trenches, Utility Trenches, Bridge Abutments, Conduit Trenches, Pile Excavations, and Retaining Walls).

4.2. Structural Fill (Foundation Subbase, Subfooting, Floor Slab Base, and Pipe Bedding)

4.3. Other Uses (Abandoned Underground Storage Tanks, Wells, Abandoned Utility Company Vaults, Voids Under Pavement, Sewers and Manholes, and to contend with Muddy Conditions)

FF.-5. Flowable Fill Materials

5.1. Materials shall comply with the recommendations within chapter 3 of ACI 229, which include cement, aggregates, fly ash, water, admixtures, slag and other non standard materials.

FF.-6. Quality Control

6.1. Compressive strength shall be the preferred method of testing for acceptance and quality control. Compressive strength testing shall be governed by the guidelines set forth in ACI Committee Report 229. Strength values can be correlated to CBR values, bearing capacity, subgrade modulus and other parameters.

6.2. Modified Flow shall be the preferred method of testing consistency, as set forth in ACI Committee Report 229.

FF.-7. Mixture Design Requirements

7.1. The mixture shall be proportioned to achieve the strength requirements set forth by the architect, engineer or other authorised representative of the owner and be sufficiently fluid to meet the intended placement application.

7.2. Flowable Fill shall have a minimum 28 day compressive strength of 0.2MPa, unless otherwise specified.

7.3. The strength requirements for flowable fill intended to be excavatable using hand tools shall not exceed 0.5MPa.

7.4. The strength requirements for flowable fill intended to be excavatable using machine equipment shall not exceed 1.5MPa.

7.5. The diameter of spread material in the modified flow test shall be not less than 200mm.

FF.-8. Construction

8.1. It is strongly recommended that a pre-installation conference be held prior to commencement of field operations. Items to be discussed will include, but not limited to, establishing procedures to maintain optimum working conditions, reviewing mix designs, excavatable vs. non-excavatable applications and movements of trucks to points of discharge.

8.2. Flowable Fill shall be protected from freezing for at least 24 hours after placement.

8.3. When Flowable Fill is to be used around objects subject to floating; i.e. pipes, tanks, pools etc., the contractor shall take appropriate measures, such as, straps, soil anchors or other approved methods to prevent flotation or misalignment. Steps shall be taken to protect sub-surface drains from intrusion of the flowable fill and ensure continued operation.

8.4. Flowable fill is a fluid material, which prior to setting, will exert a high fluid pressure on formwork, wall/embankments, or other containment structures. The Contractor shall design all formwork or other containment structures accordingly.

FF.-9. References

ACI 229, "Controlled Low Strength Materials," ACI Manual of Concrete Practices, vol. 1, Detroit, Michigan, 1995 edition.