CCT Guide Specification for Controlled Low Strength

Stable Flow is a Controlled Low Strength Material (CLSM) used primarily as structural fill in replacement of compacted soil. Formulated for the production of low-density foams, it is both self-leveling and self-compacting. Flowable Fill/CLSM mixtures are an economical alternative to soil, granular material or other compacted backfill products. In addition, it increases trucking efficiency as load deliveries can be maximized with this lighter material.

***Flowable Fill Strengths:***

|  |  |
| --- | --- |
| **Excavatable/Removable** | **Non-excavatable/Non-removable** |
| 30-150 psi | 151-1200 psi |

**Uses of Flowable Fill Include:**

BACKFILL

* Sewer Trenches
* Utility Trenches
* Bridge Abutments
* Conduit Trenches
* Pile Excavations
* Retaining Walls

STRUCTURAL FILL

* Foundation Sub base
* Sub footing
* Floor Slab Base
* Pipe Bedding

OTHER USES

* Abandoned Underground Storage Tanks
* Wells
* Abandoned Utility Company Vaults
* Voids Under Pavement
* Sewers and Manholes
* Muddy Conditions

**The Guideline below refers to Excavatable or Removable Flowable Fill:**

|  |  |
| --- | --- |
| Materials: | Mix design parameters: |
| Cementitious Materials | 450 lbs |
| (Portland Cement Type I or II, Fly Ash or Slag) | (Portland Cement Type I or II, Fly Ash or Slag) |
| Sand | None |
| Water | 30 gal |
| Air | 76% |
| Unit Weight | 30 pcf |

**Stable Flow uses the following ASTM procedures and references to determine various properties:**

|  |  |
| --- | --- |
| **ASTM Spec. Number** | **Title** |
| ASTM C 796 | Testing Foaming Agents Used in Producing Cellular Concrete Using Preformed Foam |
| ASTM C 513 | Standard Test Method for Obtaining and Testing Specimens of Hardened Lightweight Insulating Concrete for Compressive Strength |
| ASTM C 495 | Standard Test Method for Compressive Strength of Lightweight Insulating Concrete |
| ASTM C 869 | Standard Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete |
| ASTM D 4832-95el | Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders |
| ASTM D 5971-96 | Standard Practice for Sampling Freshly Mixed Controlled Low Strength Material |
| ASTM D 6103-07 | Standard Test Method for Flow Consistency of Controlled Low Strength Material |
| ASTM D 6023-96 | Standard Test Method for Unit Weight, Yield, Cement Content and Air Content (Gravimetric) or Controlled Low Strength Material (CLSM) |
| ASTM D 5971-96 | Standard Practice for Sampling Freshly Mixed Controlled Low Strength Material |
| ASTM D 6024-96 | Standard Test Method for Ball Drop on Controlled Low Strength Material (CLSM) to Determine Sustainability for Load Application |
| ACI 229R-99 | Controlled Low Strength Materials, Ch.8 LD-CLSM Using Preformed Foam |

**The following are some of the benefits using CLSM Stable Flow:**

1.The biggest benefits for using flowable fill instead of earth material is safety, ease of placement with superior results. This is also a time consuming process and typically yields call backs when settlement occurs.

2. Because CLSM is a self-leveling and self-compacting material, it does not required conventional placing and compacting equipment. The alternative puts a worker in a trench to fill the hole in a series of earth compacted lifts.

3. CLSM flowability and stiffer consistency allow the material to fill voids and spaces that prove to be difficult or impossible with granular compacted fill at sufficient strength which puts the worker in a potentially unsafe position

4. CLSM has thermal resistant ( R-value of 2), which significantly higher than most construction insulated materials.

5. CLSM prevents cracks and other compromising environmental damage caused by freezing and thawing.

6. CLSM permeability coefficient can be custom designed specified by engineer. Design can be as permeable as uniform sand or as dense as clay. The typical range is between of 4.0 x E-4 in/sec and 4.0 x E-8 in/sec.

7 .CLSM unconfined compressive strength of 150 psi (75-80% air), considered to be excavatable by hand tools and conventional machinery such as backhoes.

8. ASTM C260 certified.

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