

Black text – from standard FAA spec	Blue text – additions to FAA standard spec
Strikeout text – deletions from FAA standard spec	Red text – notes to the Engineer/won't appear in spec

I. DESCRIPTION

- A. GENERAL
1. Furnish, transport and place flowable controlled low-strength material (CLSM)
 2. As backfill in
 - a) trenches
 - b) substitute for base or subbase course
 - c) other uses
 3. Backfill of utility trenches may require coordination with affected utility companies.
 4. In accordance with the plans and with these specifications

II. MATERIALS

- A. PORTLAND CEMENT
1. Conform to ASTM C 150:
 - a) Type II or V
 2. Not accepted:
 - a) Partially set or contains lumps
 - b) Cement from salvaged bags
- B. FLY ASH
1. Conform to ASTM C 618
 - a) Class F
- C. FINE AGGREGATE (SAND)
1. Conform to ASTM C 33
 - a) except for gradation which shall be per Table 1:

TABLE 1	
SIEVE SIZE	PERCENT PASSING BY WEIGHT
¾ INCH	100
NO. 200	0-12

- D. WATER
1. Free of oil, salt, acid, alkali, sugar, vegetable matter, other injurious substances
- E. DYES
1. CLSM for utility trench backfill shall be dyed in accordance with the requirements of Section 5, Utilities.

III. MIX DESIGN

- A. PROPORTIONS
1. Submit Mix Design showing
 - a) Material proportions
 - b) Material sources
 - c) Admixtures
 - d) Dry cubic yard batch weights
 2. Mix shall contain, per cubic yard, at least:
 - a) 50 pounds cement
 - b) 250 pounds fly ash
 - c) balance aggregate, water and approved admixtures
- B. 28-DAY COMPRESSIVE STRENGTH:
1. 100-200 psi
 2. specimens

- a) made per ASTM C 31, except
 - (1) not rodded or vibrated
 - (2) air cured in molds for curing period
- b) tested per ASTM C 39.
- c) No significant strength gain after 28-days
 - (1) as demonstrated by test results

C. CONSISTENCY

- 1. Such that can be placed without segregation
- 2. Approximate desired consistency:
 - a) Fill open 3-inch diameter container with mixture
 - b) Pull container straight up
 - c) Should result in 8-inch circular spread without segregation

D. ADJUST PROPORTIONS

- 1. To achieve proper suspension/flow.
- 2. Maintain theoretical yield at one CY for given batch weights.

IV. CONSTRUCTION METHODS

A. PLACEMENT

- 1. Placement
 - a) Any reasonable means of placement allowed
 - b) Agitation required during transport and wait time
 - c) Do not displace pipes or structures
 - d) Avoid intrusion of CLSM into unwanted places
 - e) Bring up level uniformly
 - f) Each placement should be continuous operation if possible
 - (1) If not possible, ensure that lower levels are clear of surface water, debris.
- 2. Limitations on placement
 - a) Not placed on frozen ground.
 - b) Air and ground temperature shall be at least 35 deg F and rising
 - c) CLSM shall have temperature of at least 40 deg F
 - d) Mixing and placing to stop
 - (1) if air temperature is 40 deg F and falling, or
 - (2) if anticipated air or ground temperature will be 35 deg F or less in next 24 hours.

B. CURING AND PROTECTION

- 1. Curing
 - a) Maintain CLSM at temperatures above freezing for 72 hours.
 - b) CLSM subjected to freezing temperatures may be rejected by the Engineer if damage is observed.
- 2. Protection
 - a) For a period of 48 hours / or until compressive strength is 15 psi:
 - (1) Shall not be subject to loads
 - (2) Shall remain undisturbed by construction activities
 - (3) Contractor must provide evidence that requisite strength has been met.
 - (a) acceptable evidence = compressive strength tests from mix design

V. MATERIAL ACCEPTANCE

A. MATERIAL ACCEPTANCE

- 1. Based on mix design approval and batch tickets
- 2. Contractor shall verify mix by testing additional 5,000 CY of material from job delivery

- a) Compressive tests to determine conformance with mix design
- b) Adjustments may be required for subsequent deliveries.

VI. SUBMITTAL REQUIREMENTS

- A. MIX DESIGN
 - 1. Materials
 - 2. Strength

VII. METHOD OF MEASUREMENT

- A. CLSM FOR UTILITY TRENCHES
 - 1. Not measured for payment
 - 2. Considered incidental to utility installation
- B. CLSM FOR BASE OR SUBBASE COURSE
 - 1. per cubic yard

VIII. BASIS OF PAYMENT

- A. PAID AT CONTRACT UNIT PRICE UNDER ITEM NUMBER
 - 1. 24.1 CLSM for Base or Subbase Course – per cubic yard
 - 2. Is full compensation for all materials, labor, equipment, tools and incidentals.
 - 3. No separate payment for work in areas of night or limited-time construction area.
 - 4. No separate payment if coordination with utility companies required.

IX. TESTING REQUIREMENTS

- A. ASTM C 31 MAKING AND CURING CONCRETE TEST SPECIMENS IN THE FIELD
- B. ASTM C 39 COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE

X. MATERIAL REQUIREMENTS

- A. ASTM C 33 SPECIFICATION FOR CONCRETE AGGREGATES
- B. ASTM C 150 SPECIFICATION FOR PORTLAND CEMENT
- C. ASTM C 618 SPECIFICATION FOR COAL FLY ASH AND RAW OR CALCINED NATURAL POZZOLAN FOR USE AS A MINERAL ADMIXTURE IN CONCRETE
- D. ASTM C 595 SPECIFICATION FOR BLENDED HYDRAULIC CEMENTS

XI. END OF SECTION