

TEXAS DEPARTMENT OF TRANSPORTATION

GOVERNING SPECIFICATIONS

<u>ITEM NO.</u>	<u>DESCRIPTION</u>
401	Flowable Fill
512	Portable Concrete Traffic Barriers

ITEM 401
FLOWABLE BACKFILL

401.1. Description. Furnish and place flowable backfill for trench, hole, or other void.

401.2. Materials.

- A. **Cement.** Furnish cement conforming to DMS-4600, "Hydraulic Cement."
- B. **Fly Ash.** Furnish fly ash conforming to DMS-4610, "Fly Ash."
- C. **Chemical Admixtures.** Furnish chemical admixtures conforming to DMS-4640, "Chemical Admixtures for Concrete."
- D. **Fine Aggregate.** Provide fine aggregate that will stay in suspension in the mortar to the extent required for proper flow and that meets the gradation requirements of Table 1.

Table 1
Aggregate Gradation Chart

Sieve Size	Percent Passing
3/4 in.	100
No. 200	0-30

Test fine aggregate gradation in accordance with Tex-401-A.

Plasticity Index (PI) must not exceed 6 when tested in accordance with Tex-106-A.

- E. **Mixing Water.** Use mixing water conforming to the requirements of Item 421, "Hydraulic Cement Concrete."

401.3. Construction. Submit a construction method and plan, including mix design and shrinkage characteristics of the mix, for approval. Provide a means of filling the entire void area, and be able to demonstrate that this has been accomplished. Prevent the movement of any inserted structure from its designated location. If voids are found in the fill or if any of the requirements are not met as shown on the plans, remove and replace or correct the problem without additional cost to the Department.

Unless otherwise shown on the plans, furnish a mix meeting the requirements of Sections 401.3.A, "Strength," and 401.3.B, "Consistency."

- A. **Strength.** The 28-day compressive strength range, when tested in accordance with Tex-418-A, must be between 80 psi and 150 psi unless otherwise directed. Two specimens are required for a strength test, and the compressive strength is defined as the average of the breaking strength of the 2 cylinders.
- B. **Consistency.** Design the mix to be placed without consolidation and to fill all intended voids. Fill an open-ended, 3-in.-diameter-by-6-in.-high cylinder to the top to test the consistency. Immediately pull the cylinder straight up. The correct consistency of the mix must produce a minimum 8-in.-diameter circular spread with no segregation.

When necessary, use specialty type admixtures to enhance the flowability, reduce shrinkage, and reduce segregation by maintaining solids in suspension. All admixtures must be used and proportioned in accordance with the manufacturer's recommendations.

Mix the flowable fill using a central-mixed concrete plant, ready-mix concrete truck, pug mill, or other approved method.

Furnish all labor, equipment, tools, containers, and molds required for sampling, making, transporting, curing, removal, and disposal of test specimens. Furnish test molds meeting the requirements of Tex-447-A. Transport, strip, and cure the test specimens as scheduled at the designated location. Cure test specimens in accordance with Tex-447-A. The Engineer will sample, make, and test all specimens. Dispose of used, broken specimens in an approved location and manner. The frequency of job control testing will be at the direction of the Engineer.

401.4. Measurement. This Item will be measured by the cubic yard of material placed. Measurement will not include additional volume caused by slips, slides, or cave-ins resulting from the Contractor's operations.

401.5. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Flowable Backfill." This price is full compensation for furnishing, hauling, and placing materials and for equipment, tools, labor, and incidentals.

ITEM 512

PORTABLE CONCRETE TRAFFIC BARRIER

512.1. Description. Furnish, install, move, and remove portable precast concrete traffic barrier.

512.2. Materials. Barrier sections will be furnished by the Department when shown on the plans. Furnish new barrier using materials that meet the pertinent requirements of the following Items:

- Item 421, "Hydraulic Cement Concrete"
- Item 440, "Reinforcing Steel"
- Item 442, "Metal for Structures."

When temporary barrier is to be furnished and retained by the Contractor, products from nonapproved sources or previously used product may be provided if the Contractor submits written certification that the barrier sections and materials substantially conform to the requirements of this Item. The Engineer may approve the use of the product if:

- the barrier sections substantially meet typical cross-sectional dimension requirements,
- there is no evidence of structural damage such as major spalling or cracking, and
- the general condition of both the barrier sections and their connectors is acceptable.

Barrier sections to be furnished by the Department will be at a stockpile location or existing concrete traffic barrier installation shown on the plans.

512.3. Construction. Notify the Engineer of the location of the casting site and the date on which the work will begin. Multi-project fabrication plants (as defined in Item 424, "Precast Concrete Structures (Fabrication)") that produce concrete traffic barrier must be approved in accordance with DMS-7350, "Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Traffic Barrier." The Construction Division maintains a list of approved multi-project plants. Construct barrier in accordance with Item 420, "Concrete Structures," to the dimensions and cross-sections shown on the plans. Provide forms and cure concrete in accordance with Item 424, "Precast Concrete Structures (Fabrication)."

Provide a rough texture to the bottom surface of Single Slope, F Shape, or Safety Shape barriers and to the top of Low Profile barriers similar to a wood float finish.

Remove formwork after the concrete has reached sufficient strength to prevent physical damage to the member. When the barrier sections have attained sufficient strength to permit handling without causing visible damage, move the barrier sections to a storage area and place them on blocking to prevent damage.

Produce precast barrier to the tolerances given in Table 1 unless otherwise shown on the plans.

**Table 1
Precast Barrier Tolerances**

Dimension	Tolerance
Length	±1"
Insert Placement	±1/2"
Horizontal Alignment	±1/8" per 10 ft. of length
Deviation of Ends:	
Horizontal Skew	±1/4"
Vertical Batter	±1/8" per foot of depth

Install the barrier sections in accordance with the details shown on the plans or as directed.

Stockpile portable barriers no longer required on the project and to be retained by the Department, not designated for permanent use, at a site shown on the plans or as directed. Haul Department-owned connection hardware after use to the Department warehouse nearest the project unless otherwise shown on the plans or as directed.

Repair or replace all concrete traffic barrier or connecting hardware damaged by the Contractor's operations at the Contractor's expense.

Repair or replace any pavement damaged in the process of installing, moving, or removing barrier at the Contractor's expense.

512.4. Measurement. This Item will be measured by the foot based on the nominal lengths of the barrier sections.

512.5. Payment. The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Portable Concrete Traffic Barrier" of the work category (Furnish and Install, Designated Source, Move, Stockpile, or Remove), shape (e.g., Safety Shape, Single Slope, F Shape, or Low Profile) and type (1, 2, 3, etc.) of barrier specified. This price includes equipment, labor, tools, and incidentals.

- A. Furnish and Install.** This price is full compensation for furnishing and installing barrier and connection hardware.
- B. Designated Source.** This price is full compensation for delivering and installing Department-furnished barrier and connection hardware from a designated source.
- C. Move.** This price is full compensation for moving barrier installations on the project from one location to another (including disassembly and reassembly costs), moving barrier from an installation on the project to a temporary storage area (including disassembly costs), and moving barrier from a temporary storage area to an installation site on the project (including assembly costs).
- D. Stockpile.** This price is full compensation for removing barrier and connection hardware from the project and delivering to the Department stockpile area shown on the plans or as directed.
- E. Remove.** This price is full compensation for removing barrier and connection hardware from the project and retained by the Contractor.