
Instructions for use

Construction Specifications 33—Shotcrete

1. Applicability

Construction Specification 33 is applicable to the placement of dry mix and wet mix shotcrete.

2. Material specifications

The following material specifications complement Construction Specification 33:

531—Portland Cement

522—Aggregates for Portland Cement Concrete

534—Concrete Curing Compound

3. Included items

Items to be included in contract specifications and drawings follow:

- a. Complete engineering drawings and structural detail drawings as specified in Section 6, National Engineering Handbook, including as a minimum:
 - (1) Plans and cross sections showing the surface dimensions and thickness of all shotcrete slabs, walls, or layers and neat pay lines.
 - (2) Reinforcement details including bar placement diagrams.
 - (3) Finish lines and grades.
 - (4) Joint and edge details.
- b. The condition or orientation of subgrade material or surfaces. Identify wet areas that will require special treatment. Detail the special treatment that will be required (special shotcrete mixtures that may include silica fume and/or accelerators for flash sets, drainage blankets, special subsurface treatment).
- c. Notes as necessary to indicate special placement or finishing requirements.
- d. Type of cement.
- e. Special admixtures; i.e., silica fume, fibers, high range water reducers, air entraining, and accelerators. Calcium chloride shall not be used in shotcrete containing steel embeddings.
- f. Required compressive strength.

- g. Nozzleman qualifications as stated in section 6 are considered appropriate for most complex jobs with significant amount of concrete. Qualification requirements may be reduced for small, simple jobs as determined by the designer.
- h. Volumetric batching is permitted in section 7 for projects with difficult access, small volumes of shotcrete, or low placement rates. Volume batching where permitted shall be specified in section 19 by aggregate and cement batching by the bag or pre-blended dry cement and aggregate.
- i. Specify in section 19, type and class of curing compound. Refer to Table A-31 in the instructions for Construction Specification 31, Concrete for Major Structures for guidance in selecting the curing compound (ASTM C309) or curing and sealing compound (ASTM C1315). Include the type and class as applicable. For example state, "In Section 2, curing compound shall comply with ASTM C309, Type 2 or ASTM C1315, Type II."

4. Methods

Section 18, Measurement and payment

Method 1—Intended for use where shotcrete in place is to be reasonably uniform in shape and thickness so that measurement of the surface area will be feasible and representative of the amount of shotcrete placed.

Method 2—Intended for use where measurement of shotcrete in place is not feasible or when payment by material in place is not feasible or when payment by material used rather than shotcrete in place is desirable for other reasons.

When specifications are prepared using electronic procedures and all measurement and payment methods but one are deleted for use in a contract specification, delete from the last paragraph, **All Methods** *The following provisions apply to all methods of measurement and payment.* Left justify the remaining text.

5. Items of work and construction details

Starting at the top of page 33-7, prepare and outline job specific "Items of Work and Construction Details" (IWCD) in accordance with these instructions.