

DELAWARE CONSTRUCTION SPECIFICATIONS

NONSTRUCTURAL CONCRETE BASE SLABS CS 32

1. SCOPE

The work shall consist of furnishing, forming, placing, finishing and curing portland cement concrete as required to build the nonstructural concrete base slabs designated on the drawings.

2. MIXING AND DELIVERY

The concrete shall be delivered in accordance with the provisions of ASTM Specification C-94 and as further specified in Section 10 of this specification.

3. PREPARATION OF SUBGRADE

Prior to placement of concrete, the subgrade shall be free of chips, sawdust, debris, water, ice, snow, extraneous oil, mortar, or other harmful substances or coatings. Rock surfaces shall be cleaned by wire brush scrubbing and shall be wetted immediately prior to placement of concrete. Unless otherwise specified, concrete is to be placed over clean, well graded gravel. Earth surfaces shall be firm and damp. Placement of concrete on mud, dried earth or uncompacted fill or frozen subgrade will not be permitted.

Items to be embedded in the concrete shall be positioned accurately and anchored firmly.

4. PLACING

Concrete shall not be placed until the subgrade has been inspected and approved by the NRCS Technician prior to the time of concrete placement. Such notice shall be far enough in advance to give the Technician adequate time to inspect the subgrade and other preparations for compliance with the specifications before the concrete is delivered for placing.

The concrete shall be deposited as closely as possible to its final position and shall be worked into the corners and angles and around all reinforcement and embedded items in a manner to prevent segregation of aggregate or excessive laitance.

Unless otherwise specified, slab concrete shall be placed to design thickness in one continuous layer. Immediately after the concrete is placed, it shall be consolidated as necessary to insure uniform surfaces and dense concrete. If placing is discontinued when an incomplete horizontal layer is in place, the unfinished end of the layer shall be formed by a vertical bulkhead.

5. **EXPANSION AND CONTRACTION JOINTS**

Expansion and contraction joints shall be made only at locations shown on the drawings. The maximum spacing shall not exceed 20 feet in either direction.

The joints shall be made by a jointer or groover, the insertion and subsequent removal of a thin wooden strip, metal plate or other suitable template in such a manner that the corners of the concrete will not be chipped or broken. Saw cuts may be used instead of constructed joints. The depth of the cut or groove should be approximately 1/3 of the slab thickness.

If construction joints are needed, they shall be placed in locations and in a manner approved by the NRCS Technician.

6. **FINISHING SURFACES**

All exposed surfaces of the concrete shall be accurately screeded to grade.

Excessive floating or troweling of the surface while the concrete is soft will not be permitted. The addition of dry cement or water to the surface of the screeded concrete to expedite finishing will not be allowed.

A nonslip texture to the surface to facilitate unloading may be created by "brooming" the finish.

7. **CURING**

Concrete shall be prevented from drying for a period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period, or until curing compound is applied as specified below. Moisture shall be maintained by sprinkling, flooding, or fog spraying or by covering with continuously moistened canvas, cloth mats, straw, sand, or other approved material. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged.

Concrete, except at construction joints, may be coated with an approved curing compound in lieu of continued application of moisture. The compound shall be applied at a uniform rate of not less than one gallon per 150 square feet of surface and shall form a continuous adherent membrane over the entire surface. Curing compound shall not be applied to surfaces requiring bond to subsequently placed concrete, such as at construction joints, reinforcing steel, and other embedded items. If the membrane is damaged during the curing period, the damaged area shall be sprayed at the rate of application specified above.

8. **REMOVAL OR REPAIR**

Concrete that is honeycombed, damaged, or otherwise defective shall be removed and the defective parts repaired. The NRCS Technician will determine the required extent of removal, replacement, or repair. The plan for effecting the repair must be approved by the Technician prior to beginning the repair work.

9. **CONCRETING IN COLD WEATHER**

Concrete shall not be mixed nor placed when the daily minimum atmospheric temperature is less than 40°F. unless facilities are provided to maintain the temperature of the concrete between 50°F and 70°F. during the curing period. The temperature of the concrete at the time of placing shall not be less than 50°F. nor more than 90°F. Calcium chloride may be used, at a rate not to exceed 2% by weight of the cement, as an accelerator. Calcium chloride is not an antifreeze and its use does not eliminate the need for protecting the concrete from freezing. If Type III cement is used, the curing period as specified in Section 6 can be reduced to 3 days.

10. **CONCRETING IN HOT WEATHER**

The supplier shall apply effective means to maintain the temperature of the concrete below 90°F. during mixing and conveying. Exposed surfaces shall be continuously moistened by means of fog sprays or otherwise protected from drying while being placed and during the curing period.

11. **QUALITY OF CONCRETE**

- a. **Class of Concrete.** The supplier shall be responsible for the design of the concrete mix including admixtures, and for certification by tests that the compressive strength at 28 days is equal to or greater than

3000 psi. The concrete mix shall have not less than 5.5 sacks of cement per cubic yard.

b. **Materials.**

Cement shall be Type I, IA, II, IIA, III or IIIA.

Aggregates shall conform to ASTM C-33. Coarse aggregates may be size 57 or 67.

Admixtures will be used in accordance with ASTM C-494, Chemical Admixtures for Concrete.

c. **Air Content and Consistency.** Entrained air shall range from 5 to 7 percent. The slump range shall be from 3 to 5 inches.

d. **Concrete** shall be delivered to the site and discharged within 1-1/2 hours after the introduction of the cement to the aggregates. This time may be extended if the slump remains within specified limits without the addition of water to the batch. When the temperature of the concrete is 85°F. or above, the time between introduction of the cement to the aggregates and discharge shall not exceed 45 minutes unless a set retarder is used in the mix.