NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

IA-32 CONCRETE FOR NONSTRUCTURAL SLABS

1. SCOPE

The work shall consist of forming, placing, finishing, and curing Portland cement concrete slabs including steel reinforcement.

2. MATERIALS

Portland Cement shall be Type I or Type II Portland cement.

Air entraining agents shall conform to ASTM C 260.

Fly ash may be used as a partial substitution for Portland cement and shall be in strict compliance with ASTM C 618, Class F or C. The loss by ignition shall not exceed 4.0 percent.

Blast-furnace slag may be used as a partial substitution for Portland cement and shall be in conformance with ASTM C 989 for ground granulated blast–furnace slag (GGBF slag).

Water-reducing admixtures shall conform to ASTM C 494 and may be of Type A, D, F or G. Type D or G admixtures may be used when the air temperature is over 80 degrees F. at the time of mixing and/or placement.

Preformed expansion joint filler shall be a commercially available product made of bituminous, sponge rubber or closed cell foam materials with a minimum thickness of 1/2 inch.

Coarse and Fine Aggregate shall conform to ASTM C 33 and shall be clean, hard, durable and free from clay or coating of any character. The maximum size of coarse aggregate shall be 1 ½ inches or as shown on the drawings.

Reinforcing steel shall be deformed billet-steel bars, Grade 40 or 60. Welded wire fabric shall conform to the requirements of ASTM A 185.

Water shall be clean and free of harmful chemicals.

Calcium Chloride or other antifreeze compounds or accelerators will not be allowed.

3. CONCRETE MIX

The concrete mix shall provide a minimum strength of 3500 psi at 28 days. The mix shall contain not less than 6 sacks of cement per cubic yard and not more than 5.6 gallons of water per sack of cement. The water/cement ratio shall not exceed 0.50 including free water in the aggregates. Air entrainment shall range from 4% to 8%. The slump shall be 2 to 5 inches except when superplasticizer is used. The slump shall be 3 inches or less prior to the addition of superplasticizer admixture and shall not exceed 7 1/2 inches following addition and mixing.

The contractor shall be responsible for determining the design mix proportions and shall provide a copy of the mix to the NRCS Inspector at least 3 days prior to placing any concrete. A concrete batch ticket shall be supplied to the Inspector at the time of delivery to the site. The minimum information to be included shall be the name of the supplier, size of load, time of loading, type and amount of cement, type and amount of admixtures, saturated surface dry weights of fine and coarse aggregate, mixing water added at the plant and free water in aggregates.

4. REINFORCING STEEL

Reinforcing steel shall be free from loose rust, concrete, oil, grease, or paint.

Reinforcing shall be accurately placed and secured in position in a manner that will prevent its displacement during placement of concrete. The use of heat or welding in cutting, bending and splicing of reinforcing steel will not be permitted.

In slabs, steel shall be supported by precast concrete bricks, corrosion resistant metal chairs, or non-metal chairs. The concrete brick shall have strength equal to or greater than 3500 psi. Metal chairs shall have a protective epoxy coating, plastic coating, galvanized finish or be stainless steel.

Splices of reinforcing bars shall be lapped 30 diameters but not less than 12 inches. Bars shall not be spliced by welding. Welded wire fabric shall be lapped at least one mesh width.

5. SUBGRADE

The subgrade shall be excavated or filled with suitable material to produce the required subgrade elevation(s). Subgrade materials shall be blended or unsuitable materials removed and replaced as required to obtain uniform materials, moisture and compaction. Fill sections shall be thoroughly compacted in layers to the specified density and shall extend a minimum of 1 foot beyond the form lines. The subgrade shall be uniformly smooth, moist, dense, and free of ruts, frost, mud and standing water prior to placement of concrete.

If the above requirements for subgrade cannot be achieved using in-place materials, a granular base shall be provided, as specified or shown on the drawings. Granular base shall be well compacted, meeting all requirements for subgrade listed in the preceding paragraph.

Grading tolerances for the finished subgrade (or granular base, if used) shall be a maximum of ¼ inch above grade to ½ inch below grade. If granular base is provided between the subgrade and the concrete, grading tolerances for the subgrade shall be plus or minus 0.1 foot.

6. FORMS FOR CONCRETE

All edges shall be formed. All forms shall be true to line and grade, mortar tight, and rigid. Forms shall be left in place for a minimum of 24 hours.

7. PLACING CONCRETE

Concrete shall not be placed until the subgrade, granular base, forms, and steel reinforcement have been inspected and approved by the Inspector. Any deficiencies are to be corrected before the concrete is delivered for placement.

Concrete shall be placed in final position within one and one-half hours after mixing the aggregate with cement and shall be consolidated by spading or mechanical vibration. The concrete shall not be forced to flow laterally to its final location. Concrete shall not be dropped more than 5 ft. vertically.

Addition of water at the job site may be done at the beginning of placement of each load of concrete in order to obtain allowable slump, provided that the specified water/cement ratio will not be exceeded. Addition of water will not be permitted after placement of the load has proceeded.

Concrete shall be placed at air temperatures between 40^{o}F and 80^{o}F, unless special measures are taken to protect the concrete. Review special concrete placement procedure with NRCS prior to placement of concrete. Concrete shall be protected from freezing for 7 days after placement.

8. JOINTS

Install joints as shown on the drawings. A formed construction joint shall be made at the locations shown on the drawings, at the end of the day or at any time when a cold joint would occur.

Control joints are required every 12.5 to 15 ft. in both directions, unless otherwise shown on the drawings. They shall be tooled or sawed to a depth of 1/4 of the slab thickness.

9. CURING CONCRETE

Concrete shall be cured for 7 days by either:

a) Applying white pigmented curing compound at a rate of 1 gallon per 150 square feet or as recommended by the manufacturer.
b) Water soak exposed surface for the entire 7 days.
c) Cover with burlap, mats or other material and maintain in a moist condition.
d) Cover with 4 mil plastic sheeting while concrete is still wet.

10. SPECIAL SPECIFICATIONS