

CONSTRUCTION SPECIFICATION

MI-160. REINFORCED CONCRETE BLOCK

1. SCOPE

Construction work covered by this specification shall not be performed between November 1 and the following April 15 unless the site conditions and/or the construction methods to be used have been reviewed and approved in writing by the NRCS engineer or their designated representative.

Specification MI-158 for reinforced concrete installation, except those dealing with "Concrete Forms" and "Form Removal and Concrete Repair", shall be followed for reinforced concrete work in reinforced concrete block construction.

2. FORMS

The low forms required for the base for reinforced concrete block construction may be relatively simple in nature. However, they must be stacked or braced sufficiently that the required dimensions for the base are obtained.

Forms higher than 12 inches should be braced on approximately 24 inch centers in both directions.

Forms shall be removed before backfilling.

3. MATERIALS

- a. Concrete blocks shall be new, hollow, load-bearing type units. They shall be dense and strong. Where the quality of a manufacturer's blocks has not been determined by laboratory tests, it may be evaluated by the following field tests:
 - (1) Break - with heavy hammer - through several parts of the block and observe the nature of the break in each instance. If the break goes through an appreciable number (approximately 20 percent) of the coarse aggregates, this is evidence of a strong block. If goes around almost all of the coarse aggregate, this indicates a weak block.

- (2) If the block has very little coarse aggregates in it, this also indicates a weak block.

Concrete blocks which have been tested and found to meet the requirements of ASTM C90 grade "N", type "I" will comply with this specification.

- b. Prefabricated wire reinforcement for embedment in horizontal mortar joints shall consist of two or more longitudinal wires that are connected by welded cross wires. The distance between weld contacts of cross wires with each longitudinal wire shall not exceed 8 inches for smooth wire nor 16 inches for deformed wire.

All wire shall be 12 gage or heavier.

- c. Mortar for concrete block work shall conform to the following:

- (1) Water used shall be clean and fit to drink.

- (2) Aggregate (sand) for mortar shall be graded so that 100 percent will pass a #4 sieve (0.019 inch), no more than 5 percent will pass a #100 sieve and no more than 1 percent will pass a #200 sieve. It shall not contain more than 1 percent of silt or clay. Sand which meets ASTM C144 will meet this criteria.
- (3) Proportions (by volume) of a mortar shall be:
 - 1 part masonry cement (ASTM C91)
 - 1 part portland cement
 - 4 to 6 parts of sand
 - or
 - 1 part portland cement
 - 1/4 part hydrated lime
 - 2 to 3 parts of sand
 - and
 - Mixing water in adequate quantity to produce workability. This will usually be about 6 gallons (22.5 kg) for each bag of portland cement or masonry cement but may be more or less depending upon the moisture of the sand.
- (4) Once mortar has been mixed, it shall be used within 2-1/2 hours. Older mortar should be discarded.
- (5) All mechanically mixed mortar shall be mixed a minimum of 5 minutes after all materials have been added. Hand mixed mortar shall be mixed at least 10 minutes and in small batches of 2 cubic feet or less.

d. Concrete for Block Core Fill (Grout) shall conform to the following:

- (1) Water used shall be clean and fit to drink.
- (2) The aggregate for grout shall not contain more than 1 percent of silt or clay and shall be graded so that 100% will pass a 1/2 inch sieve, 95 percent will pass a 3/8 inch sieve, 65 percent will pass a #4 sieve (0.19 inch) and no more than 5 percent will pass a #100 sieve (0.006 inch).

An aggregate which contains 2-1/2 parts of size No. 1 fine aggregate and 1-1/2 parts of size No. 8 coarse aggregate ASTM C404 will meet this criteria.

- (3) Proportions (by volume) of grout shall be:

- 1 part portland cement
- 1/4 part masonry cement (optional)
- 2-1/2 parts fine aggregate
- 1-1/2 parts coarse aggregate

If a combined aggregate is used, 3-1/2 to 4 parts should be used.

The optional 1/4 part of masonry cement increases the workability of the grout.

Mixing water should be in quantity adequate to produce a slump of about 6 inches. This will be about 6 gallons per bag of portland cement, but may be more or less depending upon the moisture in the aggregates.

3. BLOCKS - LAYING AND FILLING WITH GROUT

No more than 4 courses of concrete blocks (called a lift) may be laid without setting the reinforcing steel and filling the cores with grout.

The grout fill of each lift shall be terminated at approximately 4 inches below the top of the top course of blocks to provide a construction joint.

Reinforcing bars shall extend at least 30 bar diameters above the top of each lift (except the finish lift). All bars shall end at least 1-1/2 inches below the top of the grout fill of the top lift.

The cores of all concrete blocks shall be well wetted before grout fill is placed in them. There shall not be appreciable water standing on top of the previous grout pour.

The grout fill in each concrete block core shall be well tamped throughout its depth after the reinforcing steel is in place.

Tamping may be accomplished using a 48-inch length of reinforcing bar or a 1 inch x 1 inch wood strip.

4. BACKFILLING CONCRETE BLOCK WALLS

Heavy equipment may not be operated within 3 feet of the new concrete wall.

Compaction within 3 feet of the wall will be by means of hand tamping or small hand-held tamping or vibrating equipment.

Backfilling and compaction of fill adjacent to new concrete walls shall not begin in less than 10 days after placement of the concrete where the concrete temperature has been maintained at least 50°F. The NRCS engineer or their designated representative shall approve backfilling of walls where the temperature has been allowed to be less than 50°F.