

Section 913. MASONRY UNITS

913.01 General Requirements. This specification covers clay brick, concrete brick, concrete block, salvaged paving brick, precast reinforced concrete units, and structural tile for use in the construction of masonry structures.

913.02 Testing. Unless otherwise specified, testing of all units shall be done according to the ASTM or AASHTO specifications applicable to the units referred to in the following subsections.

913.03 Brick. Brick shall conform to the following nominal size limitations:

Depth, inches	Width, inches	Length, inches
2 - 2 ½	3 ½ - 3 ¾	7 ½ - 8

All brick for any structure shall be of one nominal size and shall not vary from the manufacturer's specified standard dimensions by more than $\pm 1/8$ inch in any dimension, except that for clay brick a variation in length of $\pm 1/4$ inch will be permitted and up to 2 percent of the clay brick may exceed the tolerance in dimensions.

- A. **Clay Brick.** Clay brick to be used in the construction of manholes, catch basins, and similar structures shall conform to AASHTO M91, Grade MS.

Recessed or cored brick shall be of a type approved by the Engineer.

Salvaged paving brick is permitted, providing it meets the specifications herein.

- B. **Concrete Brick.** This brick shall conform to the requirements for concrete building brick of ASTM C 55, Grade S-II.

Recessed or cored brick shall be of a type approved by the Engineer.

- C. **Sand-Lime Brick.** Sand-lime brick for use in the construction of masonry structures shall conform to ASTM C 73, Grade SW, with the following addition.

Water Absorption, 5-hr. Boiling Test

Average of 5 bricks	18 % max
Individual brick	20 % max

913.04 Concrete Masonry Units for Structures Other than Drainage Structures.

- A. **Load-Bearing Units.** Hollow load-bearing concrete masonry units shall conform to ASTM C 90, normal weight, Type II.

- B. **Non-Load-Bearing Units.** Hollow non-load-bearing concrete masonry units shall conform to ASTM C 129, normal weight, Type II.

913.05 Concrete Block for Drainage Structures. Concrete block for manholes, catch basins, and inlets shall conform to ASTM C 139, with the following exceptions.

- A. **Shape.** The blocks shall be solid curved blocks with the inside and outside surfaces curved to the required radii. The blocks shall have a groove or other approved type of joint at the ends. Curved blocks shall have the inside and outside surfaces parallel.
- B. **Size.** The nominal dimensions for length and height of the block shall be selected by the producer. The nominal dimension for width (thickness) shall be 6, 8, or 12 inches, as called for on the plans, within a tolerance of ± 3 percent. Where the specified wall thickness on the standard plans is 12 inches, a multiple block wall of two 6 inches wide blocks is permitted. The blocks shall be designed for length so that only full length or half-length blocks are required to lay the circular wall of any one course.

Blocks intended for use in the cones or tops of manholes or other structures shall have such shape as may be required to form the structure as shown on the plans with inside and outside joints not to exceed $\frac{1}{4}$ inch in thickness.

913.06 Precast Reinforced Concrete Units for Drainage Structures. The precast concrete units for tops, risers, and sump bases for manholes, catch basins, and inlets shall be circular with circular reinforcement and shall conform to AASHTO M199, with the following exceptions and additions:

- A. The internal diameter of the units shall conform to the dimensions shown on the plans.
- B. The unit for the top of the structure shall be of a design approved by the Engineer and shall be constructed so as to provide for the use of standard covers as called for on the plans. The joint with the vertical wall of the structure shall be of the same design as the joints in the circular pipe sections so as to have a uniform bearing on the full wall thickness of the pipe.
- C. Openings for pipe inlets or outlets may be constructed in the riser sections of drainage structures by blocking out the openings when casting the sections, by scribing the openings in the green concrete and removing the green concrete from the openings, or by drilling out the openings from cured concrete with a water-cooled diamond bit.
- D. The diameter of openings constructed in the sections shall be 3 inches larger than the outside diameter of the inlet or outlet pipe. The interior spacing between openings in a riser section shall not be less than 6 inches.
- E. Sump risers with base units shall be of a design meeting the approval of the Engineer.

913.07 Precast Concrete Bases for Drainage Structures. Precast concrete bases for drainage structures for sewers less than 48 inches in diameter shall conform to the details shown on the plans and shall be cast with Grade P2 or S3 concrete.

913.08 Structural Tile. Structural clay load-bearing tile shall conform to ASTM C 34, Grade LBX. Structural clay non-load-bearing tile shall conform to ASTM C 56.

913.09 Precast Concrete Slope Paving Blocks. The precast units shall be constructed to the shape and dimensions shown on the plans and shall meet the following requirements.

The minimum allowable compressive strength is 2500 psi for an average of 3 units with no individual unit less than 2000 psi.

The maximum allowable water absorption (average of 3 units) is 10 pounds per cubic foot.

The units will be sampled and tested according to ASTM C 140 with the following exceptions.

- A. **Compressive Strength.** Compression test specimens having surface dimensions of 4 by 4 inches will be sawed from the units. The specimens will be tested with the load applied in the direction of thickness of the unit.
- B. **Absorption.** The water absorption will be determined on half of the same unit from which the compression test specimen was sawed.