519 Brick Masonry and Concrete Brick or Block Masonry

519.1 Description

(1) This section describes furnishing and laying brick or concrete brick or blocks in cement mortar beds to construct manholes, inlets, or other similar drainage structures, or parts thereof.

519.2 Materials

519.2.1 Clay or Shale Brick

(1) Conform to ASTM C32, grade MS.

519.2.2 Concrete Brick and Block Masonry Units

(1) Conform to ASTM C139 as revised here in 519.2.

(2) For concrete used in footings, furnish grade A concrete conforming to 501 as modified in 716. Provide QMP for class III ancillary concrete as specified in 716.

(3) For the concrete of these units, use sized, graded, proportioned, aggregates thoroughly mixed in a batch mixer with the required proportions of cement and water, to produce a homogeneous concrete mixture of a quality that the brick or block units conform to the following requirements:

1. Have a minimum compressive strength of 5000 psi (average of 3 units) at 28 days or at the time incorporating into the work if less than 28 days.
2. The maximum water absorption must not exceed 6 percent by weight.
3. If steam curing the brick or block units, reduce the temperature at a rate not to exceed 40 F per hour until within 20 F of the outside temperature. Maintain the units at a temperature above 32 F during the first 6 days after curing.
4. Identify masonry units conforming to these specifications by stamping a mark on each unit, a pigment color code, or other engineer-approved markings.
5. Use either rectangular block units, or block units curved in shape with the inside and outside surfaces curved to the required radii. For corners use blocks with a return side not less than 1/2 the length of the normal block. Curved blocks must have inside and outside surfaces parallel.
6. Each block must have a length of not more than 18 inches, a height of not more than 8 inches. The block width or multiple block widths must at least equal the structure width the plans show.
7. If using blocks in the cones, or tops of manholes, or other structures, they may have any shape required to form the structure as the plans show with inside and outside joints not more than 3/8 inch thick. Also, design the block so that only full-length or 1/2-length units are required to lay any one course.

519.2.3 Mortar

519.2.3.1 Cement

(1) Furnish masonry cement conforming to ASTM C91, type S.

(2) Furnish hydrated lime conforming to ASTM C207.

519.2.3.2 Sand

(3) Use sand conforming to 501.2.7.2, except as follows:

- Ensure that sand subjected to the mortar strength test has a tensile or compressive strength at 3 days and 7 days of not less than 85 percent of that developed by mortar of the same proportions and consistency, made of the same cement and standard Ottawa sand.
- Use sand uniformly graded from coarse to fine conforming to the following gradation requirements:

SIEVE	PERCENT PASSING BY WEIGHT
No. 8	95-100
No. 100	25 maximum
No. 200	10 maximum

519.2.3.3 Composition and Mixing

(1) Use mortar composed of 3 parts of sand for mortar, and one part of either a mixture of 50 percent portland cement and 50 percent masonry cement, or a mixture of 75 percent portland cement and 25 percent hydrated lime.

(2) Use a machine to mix the mortar unless the engineer allows otherwise. Prepare machine-mixed mortar in an engineer-approved mixer and mix not less than 1 1/2 minutes. If preparing hand-mixed mortar, mix the sand and cement thoroughly in a clean, tight mortar box until uniform in color, then add clean water in a quantity that forms a stiff paste. Do not use mortar mixed longer than 30 minutes or that develops its initial set.

519.3 Construction

(1) Unless the plans or contract provides otherwise, construct concrete footings, not less than 6 inches thick, and that cover the entire structure area under brick or concrete block masonry.

(2) Do not construct brick or block masonry in freezing weather or if the bricks or blocks contain frost, except with the engineer's written permission and subject to the conditions the engineer requires.

(3) Before laying, thoroughly wet bricks or blocks and let the surface dry just enough to prevent slipping on the mortar.

(4) Do not use broken or chipped bricks or blocks on the structure faces except if using to shape around irregular openings.

(5) Lay the first course of bricks or blocks on a full bed of mortar. Lay bricks or blocks in courses with full and close mortar joints. Maintain horizontal courses throughout the structure. Adjoining courses must break joints by 1/2 the length of a brick or block, if possible. Make at least one course in every 7, for double-wall construction, all headers. If using brick for making closures, make their length not less than the width of a whole brick and, if possible, make closures with whole brick as headers.

(6) Do not make joints more than 1/2 inch thick and use a uniform thickness throughout the structure. Finish joints properly as the work progresses and on exposed faces strike them neatly using the "weather" joint, except if a plaster coat is required rake the joint.

(7) Apply a plaster coat of mortar to the interior and exterior surfaces of brick, concrete brick, or block masonry, in manholes, inlets, and similar drainage structures. Make this plaster coat with the same mortar used in laying the bricks or blocks and make it not less than 1/2 inch thick. Before applying a plaster coat to a brick or block surface, wet them with water and let the surface dry enough to bond to the plaster coat.

(8) As soon after applying the plaster coat to a structure as possible, apply a uniform coating of curing compound conforming to 501.2.8 to the interior and exterior surfaces.

519.4 (Vacant)

519.5 Payment

(1) The department will not pay directly for providing and laying brick masonry or concrete brick or block masonry specified under this section. This work is incidental to the various bid items using it.