

## SECTION 518 MORTAR RUBBLE MASONRY AND DRY RUBBLE MASONRY

### 518.1 Description

- (1) This section describes the classes commonly known as coursed, random, and random range work and consists of roughly squared and dressed stone laid either in cement mortar or without mortar, as the contract requires.

### 518.2 Materials

#### 518.2.1 General

- (1) Furnish portland cement and water as specified in [501.2](#). Unless the engineer allows an alternate, use either type I, IS, , or IP portland cement.
- (2) Furnish masonry cement conforming to ASTM C91, type S.
- (3) Furnish hydrated lime conforming to ASTM C207.

#### 518.2.2 Sand for Mortar

##### 518.2.2.1 General

- (1) Use sand conforming to [501.2.5](#), except for mortar strength and size requirements.

##### 518.2.2.2 Mortar Strength

- (1) Sand for mortar, if subjected to the mortar strength test, shall have 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.

##### 518.2.2.3 Size Requirements

- (1) 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

### 518.2.3 Mortar

- (1) Use mortar for laying the stone and pointing composed of 3 parts sand for mortar and one part of any one of the following materials, by volume: masonry cement, a mixture of 50 percent portland cement and 50 percent masonry cement, or a mixture of 50 percent portland cement and 50 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.

### 518.2.4 Rubble Stone

#### 518.2.4.1 General

- (1) Use stone for rubble masonry of engineer-approved quality, sound, durable, and free from segregations, seams, cracks, and other structural defects impairing its resistance to the weather. Ensure it is free from rounded, worn, or weathered surfaces. Select stones with flat faces as nearly parallel as it is practical.

#### 518.2.4.2 Size Requirements

- (1) Use 6-inch or thicker stones at least 1 1/2 times wider than they are thick. Ensure that individual stones, except headers, are at least 1 1/2 times longer than they are wide. Vary the thickness throughout the wall using thicker stones on the bottom.

#### 518.2.4.3 Header Requirements

- (1) Headers shall have the same size in the interior of the wall as shown for the face and extend 12 inches or more into the core or backing. They shall occupy 1/5 or more of the face area of the wall and be evenly distributed. Headers in walls 2 feet thick or less shall extend entirely through the wall.

### 518.3 Construction

#### 518.3.1 Shaping and Dressing Stone

- (1) Roughly square the stones on joints, beds, and faces. Use stone, roughly squared and pitched to line, at all angles and ends of walls. Finish all corners or angles in exterior surfaces with a chisel draft. If placing a wall stone with a sawed exterior surface, dress it a minimum of 50 percent before placing in the wall.
- (2) Perform all stone shaping or dressing before laying the stone in the wall and do not allow any dressing or hammering that might loosen the stone after placement.

#### 518.3.2 Laying Stone

##### 518.3.2.1 Mortar Rubble Masonry

- (1) The contractor shall not construct stone masonry in freezing weather, or if the stone contains frost, except with the engineer's written permission and subject to any conditions required.
- (2) Clean each stone surface until free of foreign matter, loose rock grains, and rock dust, then saturate with water before setting. Ensure the bed receiving the stone is clean and well moistened. Well bed all stones in freshly made mortar. Lay the masonry to line in courses roughly leveled up. For the bottom or foundation, courses use large, selected stones and lay all courses with bearing beds parallel to the natural bed of the material.
- (3) Ensure the vertical joints in each course are staggered with those in adjoining courses by at least 6 inches. The contractor shall not locate a vertical joint directly above or below a header.
- (4) Make full mortar joints and carefully settle the stones in place before the mortar sets. The engineer will not accept spalls in the beds. Provide joints and beds no more than one inch thick.
- (5) Always try to properly point the face joints before the mortar sets. If this is not possible, prepare the joints for pointing by raking them out to a depth of 2 inches before the mortar sets. Take care not to smear the stone face surfaces with the mortar forced out of the joints, or that used in pointing.
- (6) If any stone is moved or the joint broken, take up the stone, thoroughly clean the mortar from the bed and joints, and reset the stone in fresh mortar.

##### 518.3.2.2 Dry Rubble Masonry

- (1) Lay the masonry to line and in courses roughly leveled up. For the bottom or foundation courses use large, selected stones and lay all courses with bearing beds parallel to the natural bed of the material. Use sand for the initial bedding. Face joints shall not exceed one inch in width.
- (2) If laying dry rubble masonry, take care that each stone bears firmly on the underlying course at not less than 3 separate points. Chink open joints, both front and rear, with spalls fitted to take firm bearing upon their top and bottom surfaces, to secure firm bearing throughout the stone length.

#### 518.3.3 Pointing Mortar Rubble Masonry

- (1) The contractor shall not perform pointing in freezing weather or if the stone contains frost.
- (2) For joints not pointed when laying the stone, thoroughly wet the joint with clean water and fill with mortar, drive the mortar soundly into the joints and finish with an engineer-approved pointing tool. Keep the wall wet while pointing, and in hot or dry weather protect the pointed masonry from the sun and keep wet for at least 3 days after completion.
- (3) After completing the pointing and the mortar sets, clean the wall and leave it in a neat, finished condition.

#### 518.3.4 Backfill

- (1) Backfill shall conform to [206.3.13](#).

### 518.4 Measurement

- (1) The department will measure Rubble Masonry Mortar and Rubble Masonry Dry by the cubic yard acceptably completed.

### 518.5 Payment

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
518.0100	Rubble Masonry Mortar	CY
518.0200	Rubble Masonry Dry	CY

- (2) Payment for Rubble Masonry Mortar and Rubble Masonry Dry is full compensation for excavating; for preparing the bed; for providing, transporting, and placing all materials; and, unless the contract specifies granular backfill, for backfilling.
- (3) If granular backfill is required, the department will pay for backfill under the Backfill Granular bid item as specified in [209.5](#), or absent that bid item, as extra work.