

**SECTION 905 -- ROCK RIPRAP**

**905.01 -- Description**

The Contractor shall prepare the slopes and furnish and place stone on the slopes at locations shown in the plans.

**905.02 -- Material Requirements**

1. a. The rock shall be sandstone, limestone, quartzite, or other hard stone. It shall be clean and free from earth, clay, or refuse.
- b. The solid rock shall have a density of at least 140 lb/CF.
2. Each load of rock shall be graded as shown in Table 905.01. The rock shall be angular in shape to allow interlocking between the various rock sizes.

**Table 905.01**

<b>Rock Riprap Gradation Requirements</b>	
<b>Size of Rock</b>	<b>Percent of Total Weight Smaller than the Given Size</b>
Type A	
154.3 pounds	100
33.0 pounds	50
2.2 pounds	Not to exceed 10
Type B	
308.6 pounds	100
77.2 pounds	50
4.4 pounds	Not to exceed 10
Type C	
694.4 pounds	100
154.3 pounds	50
11.0 pounds	Not to exceed 10

3. a. Gradation control shall be done by a visual inspection that verifies the rock is reasonably well graded and does conform to the gradation requirements in Table 905.01.
- b. Each piece shall have no dimension greater than 3 times its least dimension.
4. Rock riprap shall not have a soundness loss greater than 14 percent by weight at the completion of 16 cycles of freezing and thawing when tested in accordance with NDR T 103. The rock riprap shall be prepared for the freezing and thawing tests by crushing to comply with the gradation requirements of coarse aggregate, as specified in Section 1033, Table 1033.03A, Class "E" aggregate.

### **905.03 -- Construction Methods**

1. a. The finished earth surface shall conform to the grades and slopes of the neat lines of the bottom surface of the riprap as shown in the plans.

b. The Contractor shall excavate for energy dissipation holes (scour holes) as prescribed in the plans.

c. All depressions shall be filled with suitable dry material which shall be thoroughly tamped or otherwise compacted to insure stability.

d. Soft, unstable materials shall be removed and replaced with suitable material which shall be thoroughly tamped or otherwise compacted to insure stability. No raised places, bumps, or depressions will be allowed.

2. The approved rock shall be dumped in such a manner as to produce a reasonably solid mass of rock within the limits shown in the plans or specified by the Engineer. All material shall be placed and distributed so that there will be no large accumulations of either the larger or smaller sizes of rock.

3. Any appreciable variation from the specified thickness of the riprap shall be corrected by redistributing the rock.

### **905.04 -- Method of Measurement**

1. Rock which is accepted and used in the construction will be measured by the ton. The weight will be determined by measuring the volume (cubic yards) of riprap placed and multiplying by 1.35 ton/cubic yard.

2. a. Quarry weight determinations will be accepted by the Engineer. The attendant at the quarry will issue tickets to the driver for each load of rock riprap delivered to the project.

b. Each ticket shall include:

(1) The name of the producer.

(2) The date.

(3) The location of the quarry.

(4) The quantity delivered (in tons).

(5) The name of the Contractor.

(6) The project number.

c. The ticket shall be given to the Engineer at the time of arrival at the placement site.

3. When any shipment's weight has not been documented, the Contractor shall measure the rock on approved scales in the presence of the Engineer.

4. When shipped by rail, the measured shipping weight of acceptable material, less material that is wasted, will be used as the basis for payment.

**905.05 -- Basis of Payment**

- | <u>Pay Item</u>         | <u>Pay Unit</u> |
|-------------------------|-----------------|
| Rock Riprap, Type _____ | Ton (Tn)        |
- Energy dissipation hole excavation is subsidiary to the rock riprap bid item.
  - Payment is full compensation for all work prescribed in this Section.