

Item 8020

Riprap (Materials Only)



1. DESCRIPTION

Furnish concrete, stone, cement-stabilized, or special riprap.

2. MATERIALS

Furnish materials in accordance with the following Items.

- Item 420, "Concrete Substructures,"
- Item 421, "Hydraulic Cement Concrete,"
- Item 431, "Pneumatically Placed Concrete,"

2.1. **Concrete Riprap.** Use Class B Concrete unless otherwise shown on the plans.

2.2. **Pneumatically Placed Concrete Riprap.** Use Class II concrete that meets Item 431, "Pneumatically Placed Concrete," unless otherwise shown on the plans.

2.3. **Stone Riprap.** Use durable natural stone with a bulk specific gravity of at least 2.50 as determined by [Tex-403-A](#) unless otherwise shown on the plans. Provide stone that, when tested in accordance with [Tex-411-A](#), has weight loss of no more than 18% after 5 cycles of magnesium sulfate solution.

Perform a size verification test on the first 5,000 sq. yd. of finished riprap stone for all types of stone riprap at a location determined by the Engineer. Test the riprap stone in accordance with ASTM D5519. Additional tests may be required. Do not deliver additional riprap until the initial 5,000 sq. yd. of riprap has been approved.

2.3.1. **Type R.** Use stones between 50 and 250 lb. with at least 50% of the stones heavier than 100 lb.

2.3.2. **Type F.** Use stones between 50 and 250 lb. with at least 40% of the stones heavier than 100 lb. Use stones with at least 1 broad flat surface.

2.3.3. **Common.** Use stones between 50 and 250 lb. Use stones that are at least 3 in. in their least dimension. Use stones that are at least twice as wide as they are thick.

2.3.4. **Protection.** Use boulders or quarried rock that meets the gradation requirements of Table 1. Both the width and the thickness of each piece of riprap must be at least 1/3 of the length.

Table 1
Protection Riprap Gradation Requirements

Size	Maximum Size (lb.)	90% Size ¹ (lb.)	50% Size ² (lb.)	8% Size ³ Minimum (lb.)
12 in.	200	80-180	30-75	3
15 in.	320	170-300	60-165	20
18 in.	530	290-475	105-220	22
21 in.	800	460-720	175-300	25
24 in.	1,000	550-850	200-325	30
30 in.	2,600	1,150-2,250	400-900	40

1. Defined as that size such that 10% of the total riprap stone, by weight, is larger and 90% is smaller.
2. Defined as that size such that 50% of the total riprap stone, by weight, is larger and 50% is smaller.
3. Defined as that size such that 92% of the total riprap stone, by weight, is larger and 8% is smaller.

- 2.4. **Cement-Stabilized Riprap.** Provide aggregate that meets Item 247, "Flexible Base," for the type and grade shown on the plans. Use cement-stabilized riprap with 7% hydraulic cement by dry weight of the aggregate.
- 2.5. **Special Riprap.** Furnish materials for special riprap according to the plans.

3. MEASUREMENT

Riprap will be measured by the cubic yard.

4. PAYMENT

Riprap (Site Delivery). The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Riprap" of the type and size specified. This price is full compensation for furnishing and hauling riprap, equipment, labor, tools, and incidentals. If bid codes in the estimate indicate location numbers, each location will be shown in the plans.