

CONSTRUCTION SPECIFICATION

MN-61. ROCK RIPRAP

1. SCOPE

The work shall consist of the construction of rock riprap revetments and blankets, including filter or bedding where specified.

2. MATERIALS

Rock riprap shall conform to the requirements of Material Specification 523 or, if so specified shall be obtained from designated sources. It shall be free from dirt, clay, sand, rock fines and other materials not meeting the required gradation limits.

At least ten (10) working days prior to delivery of rock from other than designated sources, the Contractor shall designate in writing the source from which rock materials will be obtained and provide information satisfactory to the Inspector that the material meets contract requirements. The Contractor shall provide the Inspector free access to the source for the purpose of obtaining samples for testing. The size and grading of the rock shall be as specified on the drawings.

Rock from approved sources shall be excavated, selected, and processed to meet the specified quality and grading requirements at the time the rock is installed.

When specified on the drawings or, when requested by the Inspector, a gradation quality control check shall be made by the Contractor and subject to inspection by the Inspector. The test shall be performed at the work site, in accordance to ASTM D 5519 Test Method B Size, *Size-Range Grading*, on a test pile of representative rock. The weight or size of the test pile shall be large enough to ensure a representative gradation of rock from the source and to provide test results within a five (5) percent accuracy.

Based on a specific gravity of 2.65 (typical of limestone and dolomite), and assuming the individual rock is shaped midway between a sphere and a cube, typical size/weight relationships are:

<u>Sieve Size of Rock</u>	<u>Approximate Weight of Rock</u>	<u>Weight of Test Pile</u>
16 inches	300 pounds	6000 pounds
11 inches	100 pounds	2000 pounds
6 inches	15 pounds	300 pounds

The results of the test shall be compared to the gradation required for the project. Test pile results that do not meet the construction specifications shall be cause for the rock to be rejected. The test pile that meets gradation requirements shall be left on the job site as a sample for visual comparison. The test pile shall be used as part of the last rock riprap to be placed.

Filter or bedding aggregates when required, shall conform to Material Specification 521, unless otherwise specified. Geotextiles shall conform to Material Specification 592.

3. SUBGRADE PREPARATION

The subgrade surfaces on which the rock riprap, filter, bedding or geotextile is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved materials and shall conform to the requirements of the specified class of earthfill.

Rock riprap, filter, bedding or geotextile shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved.

4. EQUIPMENT-PLACED ROCK RIPRAP

The rock riprap shall be placed by equipment on the surfaces and to the depths specified. The rock riprap shall be installed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying materials. The rock for riprap shall be delivered and placed in a manner that will ensure that the riprap in-place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks. Some hand placing may be required to provide a neat and uniform surface.

Rock riprap shall be placed in a manner to prevent damage to structures. Hand placing will be required as necessary to prevent damage to any new and existing structures.

5. HAND-PLACED ROCK RIPRAP

The rock riprap shall be placed by hand on the surfaces and to the depths specified. It shall be securely bedded with the larger rocks firmly in contact one to another without bridging. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on its vertical edge; except where it is laid like paving stone and the thickness of the rock equals the specified depth of the riprap course.

6. FILTER OR BEDDING

When the contract specifies filter, bedding or geotextile beneath the rock riprap, the designated material shall be placed on the prepared subgrade surface as specified. Compaction of filter or bedding aggregate will not be required, but the surface of such material shall be finished reasonably smooth and free of mounds, dips, or windrows.