

**INSTRUCTIONS FOR USE****MINNESOTA CONSTRUCTION SPECIFICATION 61—Rock Riprap****1. Applicability**

Construction Specification MN-61 is applicable to equipment-placed or hand-placed rock riprap, granular filter, and granular bedding. It is also applicable for riprap placed over geotextile fabrics installed in accordance with Construction Specification MN-95.

**2. Material specifications**

Material Specifications Aggregates for Drainfill and Filters-521, Rock for Riprap-MN-523, and Geotextile-592 are complementary to Construction Specification MN-61.

**3. Included items**

Items to be included in specifications and drawings follow:

- a. Complete plans and cross-sections of the required riprap.
- b. Type of placement (equipment or hand-placed).
- c. Foundation preparation requirements, if any.
- d. Bedding or filter requirements. (Normally, we specify a granular bedding layer under riprap.)
- e. Gradation requirements for material.
- f. Screening, selection, or other processing requirements to ensure obtaining rock of the required quality and grading. or example, if angular to subangular rock is preferred over subrounded to rounded rock, specify this requirement in section 7.
- g. Sources of material if the sources are to be specified. When sources are designated in the contract, the adequacy of quantity and quality of usable material at each source must be determined in advance by:
  - (1) Geologic investigations with adequate sampling and testing
  - (2) Specific case history that establishes the quality by satisfactory performance under comparable conditions of use and exposure or acceptable prequalification by other agencies.
- h. ASTM D 5240 should be specified to check for rock resistance to freeze-thaw damage on sites that have large volumes of riprap, at highly hazardous locations, or on sites that would be difficult to repair if rock breakdown occurs. Acceptance limits in the specification must be evaluated and strengthened, if needed, to ensure the use of the appropriate rock type and quality.
  - i. When geotextile filters are specified, Construction Specification MN-95 should be used.
  - j. Calculate and list the quantity of each material. The quantity can be listed by the volume (cubic yards) or weight (tons). Rock riprap weighs 1.2 to 1.7 tons per cubic yard.

**Weight**—Ton methods would be more appropriate for quarried rock imported to a site. Contractors generally pay their supplier for quarried rock by the ton. Payment by the ton provides for direct pricing without the need to convert from a ton basis to cubic yards. Variations in riprap characteristics, such as rock specific gravity, transportation and placement losses, denseness of placement, make it necessary for the contractor to add contingencies that include these variations.

**Volume**—Cubic yard methods would be more appropriate for riprap that is produced from onsite locations, for gathered field stone, quarried rock sold

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by the truck load, and other situations where a certified scale is not readily available. It would also be appropriate for small quantities of rock where quantity measurement is not complex or a major task. Cubic yard methods can also be an advantage where the riprap end section is uniform for long reaches on larger projects. The elimination of the need to keep track of delivery tickets may be a considerable time savings.

Cubic yard methods can be expected to impose some contingency considerations from the contractor because of the necessity to convert from tons to cubic yards in quantity estimation.

#### **4. Construction details**

In section 7 of construction specification MN-61, prepare and outline job specific "Construction Details" (CD) in accordance with these instructions. For ease of utilization, the use of recyclable color paper for the CD should be considered.