



Standard Practice for Specifying Rock to Fill Gabions, Revet Mattresses, and Gabion Mattresses¹

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1. Scope

1.1 This practice covers the sizes and quality of rock to fill gabions and mattresses. The term mattress as used in this standard shall include the terminology of gabion mattresses and revet mattresses used in Specifications A 974 and A 975.

1.2 This practice does not cover the sizes and quality of rock for other erosion control uses such as riprap or drainfall.

1.3 This practice does not cover the material properties or construction of gabions or mattresses.

1.4 The values in this practice are in English units and are to be regarded as the standard. SI units are given.

1.5 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace professional judgement. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

A 974 Specification for Welded Wire Fabric Gabions and Gabion Mattresses (Metallic-Coated or Poly Vinyl Chloride (PVC) Coated)²

A 975 Specification for Double-Twisted Hexagonal Mesh Gabions and Revet Mattresses (Metallic-Coated Steel Wire or Metallic-Coated Steel Wire with Poly Vinyl Chloride (PVC Coating)²

D 4992 Practice for Evaluation of Rock to be Used for Erosion Control³

D 5519 Test Method for Particle Size Analysis of Natural and Manmade Riprap Materials³

3. Terminology

3.1 *gabion, n*—a wire mesh container of variable size and interconnected with other similar containers. It is filled with rock to form flexible, permeable, monolithic structures.

3.2 *mattress, n*—a wire mesh container uniformly partitioned into internal cells with relatively small height in relation to other dimensions. Mattresses have smaller mesh opening than the mesh used for gabions.

4. Summary of Practice

4.1 The designer shall establish the suitable sizes, weight, and quality of rock for project use, and examine sources to ensure that the required rock is available.

4.2 Rock shall be delivered to the work site in a manner to minimize its reduction in sizes (breakdown) during the handling of the rock, and then place and secured within the assembled and interconnected gabion or mattress.

5. Significance and Use

5.1 Gabions and mattresses, described in Specifications A 974 and A 975, are placed on sites for stability and to prevent soil erosion. Their ability to function properly depends on their stability, which is partly dependent upon the rocks filling them. Rock sizes should be chosen to prevent them from falling through the mesh of the gabions or mattresses. The rock also has to withstand natural weathering processes during the life of the project that would cause it to breakdown to sizes smaller than the wire mesh opening dimensions.

6. Bulk Filling Materials

6.1 Rock to fill gabions or mattresses may be any natural deposit of the required sizes, or may be crushed rock produced by any suitable method and by the use of any device that yields the required size limits chosen in 7.

6.2 Rocks shall be hard, angular to round, durable, and of such quality that they shall not disintegrate on exposure to

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² *Annual Book of ASTM Standards*, Vol 01.06.

³ *Annual Book of ASTM Standards*, Vol 04.08.

water or weathering during the life of the structure. Guidance for selecting durable rock is given in Practice D 4992.

7. Standard Sizes of Rock

7.1 Guidance for measurement of rock sizes is given in Test Method D 5519. Sizes of rock to fill gabions and mattresses are chosen on the basis of the mesh sizes, the structures's thickness, and the limits shown in 7.4. Fabrication of sieves to determine particle size is given in Test Method D 5519.

7.2 Within each range of sizes, the rock shall be large enough to prevent individual pieces from passing through the mesh openings stated in Specifications A 974 and A 975. Each range of sizes may allow for a variation of 5% oversize rock by number of particles, or 5% undersize rock by number of particles, or both.

7.3 In all cases, the sizes of any oversize rock shall allow for the placement of three or more layers of rock within each gabion compartment, and two or more layers of rock within each mattress compartment dependent upon the height of the

mattresses. In all cases, undersize and oversize rock shall be placed within the interior of the gabion or mattress compartment and shall not be placed on the exposed surface of the structure. There shall be a maximum limit of 5% undersize or 5% oversize rock, or both, within each gabion or mattress compartment.

7.4 The recommended dimensions of rock are given in the following:

Type of Structure	Structure Thickness		in	Rock Sizes (m)
	in	(m)		
Gabion/Revet Mattress	6	(0.17)	3–5	76–127
Gabion/Revet Mattress	9	(0.23)	3–5	76–127
Gabion/Revet Mattress or Gabion	12	(0.30)	4–8	102–203
Gabion	18	(0.50)	4–8	102–203

7.5 Within the table, there shall be a full range of sizes between the upper and lower limits.

8. Keywords

8.1 erosion control; gabions; mattresses; rock

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