



Designation: A 975 – 97

Standard 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)¹

This standard is issued under the fixed designation A 975; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers gabions and revet mattresses produced from double-twisted metallic-coated wire mesh, and metallic-coated wire for lacing wire, stiffeners, and fasteners used for manufacturing, assembling, and installation of the product. This specification also covers gabions and revet mattresses in which the wire mesh, lacing wire, and stiffeners are poly(vinyl chloride) (PVC) coated after the metallic coating.

1.2 Double-twisted wire mesh for gabions and revet mattresses is produced in different styles, based on type of coating, as described in Section 4.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 This specification references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of this specification.

1.5 The following safety hazards caveat pertains only to the test methods portion, Section 13, of this specification: *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 consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- A 90/A 90M Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coating²
- A 313 Specification for Chromium-Nickel Stainless and Heat-Resisting Steel Spring Wire³
- A 370 Test Methods and Definitions for Mechanical Testing of Steel Products³

- A 428 Test Method for Weight of Coating on Aluminum Coated Iron and Steel Articles²
- A 641 Specification for Zinc Coated (Galvanized) Carbon Steel Wire²
- A 764 Specification for Steel Wire, Carbon, Drawn Galvanized and Galvanized at Size for Mechanical Springs³
- A 809 Specification for Aluminum-Coated (Aluminized) Carbon Steel Wire²
- A 856/A 856M Specification for Zinc-5% Aluminum-Mischmetal Alloy-Coated Carbon Steel Wire²
- A 902 Terminology Relating to Metallic Coated Steel Products²
- B 117 Test Method of Salt Spray (Fog) Testing⁴
- D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension⁵
- D 746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact⁶
- D 792 Test Methods for Specific Gravity (Relative density) and Density of Plastics by Displacement⁶
- D 1242 Test Methods for Resistance of Plastic Materials to Abrasion⁶
- D 1499 Practice for Operating Light-and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Plastics⁶
- D 2240 Test Method for Rubber Property-Durometer Hardness⁵
- G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials⁷

3. Terminology

3.1 Definitions:

3.1.1 Refer to Terminology A 902 for general terminology relating to metallic-coated steel products.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *gabion, n*—a double-twisted wire mesh container of variable sizes, uniformly partitioned into internal cells, interconnected with other similar units, and filled with stone at the

¹ This specification is under the jurisdiction of ASTM Committee A-5 on Metallic Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.12 on Wire Specifications.

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² Annual Book of ASTM Standards, Vol 01.06.

³ Annual Book of ASTM Standards, Vol 01.03.

⁴ Annual Book of ASTM Standards, Vol 03.02.

⁵ Annual Book of ASTM Standards, Vol 09.01.

⁶ Annual Book of ASTM Standards, Vol 08.01.

⁷ Annual Book of ASTM Standards, Vol 14.02.

project site to form flexible, permeable, monolithic structures such as retaining walls, sea wall, channel linings, revetments, and weirs for erosion control projects (see Fig. 1 and Fig. 2).

3.2.2 *revet mattress, n*—a double-twisted wire mesh container uniformly partitioned into internal cells with relatively small height in relation to other dimensions, having smaller mesh openings than the mesh used for gabions; revet mattresses are generally used for riverbank protection and channel linings (see Fig. 3).

3.2.3 *double-twisted wire mesh, n*—a nonraveling mesh made by twisting continuous pairs of wires through three one-half turns (commonly called double-twisted) to form hexagonal-shaped openings which are then interconnected to adjacent wires to form hexagonal openings.

3.2.4 *selvedge wire, n*—a terminal wire used to edge the wire mesh perpendicular to the double twist by mechanically wrapping the mesh wires around it at least 2.5 times or by inserting it through the twists and folding one mesh length.

3.2.5 *edge wire, n*—a terminal wire used to edge the wire mesh parallel to the double twist by continuously weaving it into the wire mesh.

3.2.6 *lacing wire, n*—for gabions and revet mattresses, a metallic-coated steel wire or metallic-coated steel wire with PVC coating used to assemble and interconnect empty units, to close and secure stone-filled units, and for internal stiffeners.

3.2.7 *fastener, n*—an alternate method to lacing wire used for binding operations for gabions and revet mattresses.

3.2.8 *stiffener, n*—for gabions, a length of metallic-coated steel wire or metallic-coated steel wire with PVC coating used for support of facing by connecting the front panel to the back panel of a gabion (stiffener formed at the project site using wire having the same diameter as for the lacing wire (see Table 1) or across the corners of a gabion cell (preformed stiffener having a diameter as specified in Table 1).

3.3 *Abbreviations: Abbreviations:*

3.3.1 *PVC*—poly(vinyl chloride).

3.3.2 *Zn-5Al-MM*—zinc-5 % aluminum-mischmetal alloy.

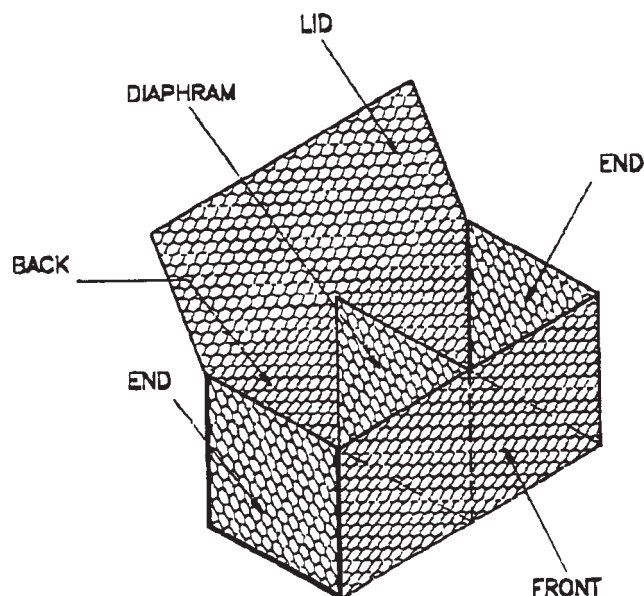


FIG. 1 Gabion

4. Classification

4.1 Double-twisted wire gabions and revet mattresses are classified according to coating, as follows:

4.1.1 *Style 1*, consists of double-twisted wire mesh made from wire which is zinc coated before being double-twisted into mesh. Fasteners, lacing wire, and stiffeners are produced from zinc-coated wire.

4.1.2 *Style 2*, consists of double-twisted wire mesh made from wire which is coated with Zn-5Al-MM before being double-twisted into mesh. Fasteners, lacing wire, and stiffeners are also produced from Zn-5Al-MM coated wire.

4.1.3 *Style 3*, consists of double-twisted mesh, lacing wire, and stiffeners as Style 1 and overcoated with PVC. Fasteners shall be of stainless steel wire.

4.1.4 *Style 4*, consists of double-twisted mesh made from wire which is aluminum-coated before being double-twisted into mesh. Fasteners, lacing wire, and stiffeners are also produced from aluminum-coated wire.

5. Ordering Information

5.1 Orders for material to this specification shall include the following information:

5.1.1 Quantity (number of units) as shown on plan,

5.1.2 Product type (gabions or revet mattresses),

5.1.3 Size (length by width by height),

5.1.4 Style of coating (Section 4), including the specific style to be furnished, or all acceptable styles,

5.1.5 ASTM designation and year of issue,

5.1.6 Any special requirements (see 8.2.5), and

5.1.7 Certification, if required (see Section 15).

NOTE 1—A typical ordering description is as follows: 100 gabions, 2 by 1 by 1 m or (6 by 3 by 3 ft), 100 revet mattresses 4 by 2 by 0.23 m or (12 by 6 by 0.75 ft) and 100 lids 4 by 2 m or (12 by 6 ft) as shown on plans; Style 1, 2, 3, or 4 with required fasteners or lacing wire and stiffeners; conforming to ASTM A-975.

6. Material and Manufacture

6.1 The wire used in the manufacture of double-twisted mesh for use in gabions and revet mattresses shall conform to the specifications shown in 6.1.1, 6.1.2, 6.1.3, or 6.1.4 as appropriate for the style ordered, except that the tensile strength shall conform to 7.1.

6.1.1 *Style 1* double-twisted mesh shall be manufactured from zinc-coated steel wire conforming to Specification A 641, Class 3 coating, soft temper.

6.1.2 *Style 2* double-twisted mesh shall be manufactured from Zn-5Al-MM-coated steel wire conforming to Specification A 856/A 856M, Class 3 coating, soft temper.

6.1.3 *Style 3* double-twisted mesh shall be manufactured from the same type of metallic-coated steel wire as Style 1 with an additional PVC coating extruded onto the metallic-coated steel wire. The PVC coating shall conform to the properties in 8.2.

6.1.3.1 Original or modified thermoplastic polymers along with their application methods can be permitted as a substitute for PVC coatings, as long as their performance is equivalent to the performance requirements of the PVC coating.

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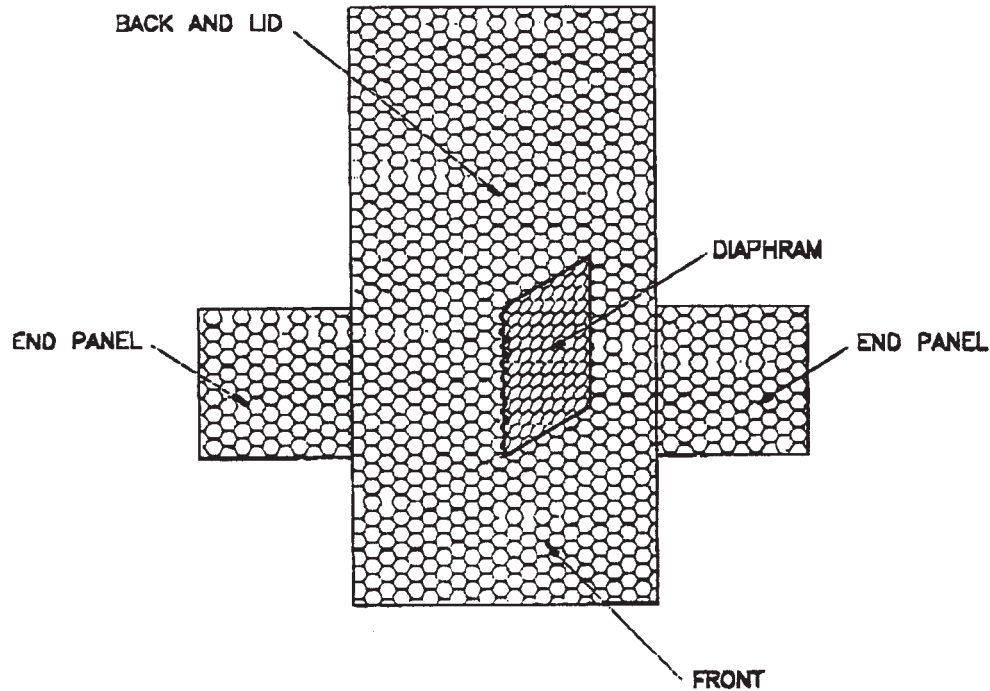


FIG. 2 Mechanically Manufactured Gabion

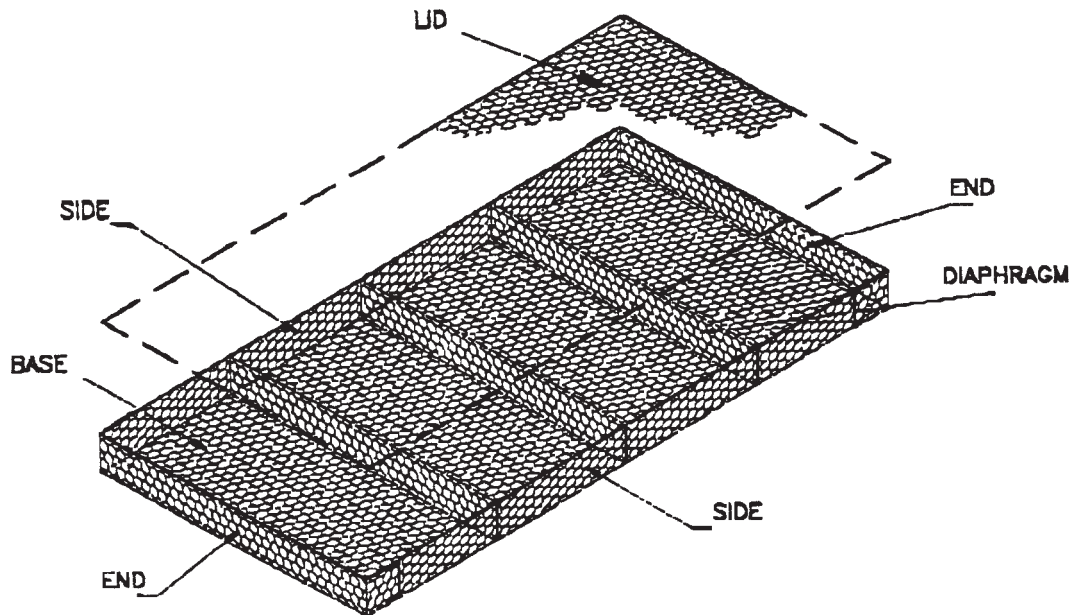


FIG. 3 Revet Mattress

6.1.4 Style 4 double-twisted mesh shall be manufactured from aluminum-coated steel wire conforming to Specification A 809, soft temper.

6.2 Lacing wire and stiffeners shall be made of wire having the same coating material as the double-twisted wire mesh furnished on the order and conforming to Specification A 641, A 856/A 856M, or A 809, with a tensile strength in accordance with 7.1

6.3 Fasteners made from zinc-coated steel wire, zinc-5 % aluminum mischmetal alloy-coated steel wire and aluminum-coated steel wire shall conform to Specification A 764, Type A,

B, or C, Class 3, with a tensile strength in accordance with 7.2. Fasteners made from stainless steel wire shall conform to Specification A 313, Type 302, with a tensile strength in accordance with 7.2.

6.4 Gabions and revet mattresses shall be manufactured with all components mechanically connected at the production facility with the exception of the mattress lid which is produced separately from the base (see Fig. 1, Fig. 2, and Fig. 3). All gabions (Fig. 1 and Fig. 2) and revet mattresses (Fig. 3) shall be supplied in the collapsed form, either folded and bundled or rolled, for shipping.