



Designation: A 974 – 97

Standard Specification for Welded Wire Fabric Gabions and Gabion Mattresses (Metallic-Coated or Polyvinyl Chloride (PVC) Coated)¹

This standard is issued under the fixed designation A 974; 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 gabion mattresses produced from metallic-coated welded wire fabric, and metallic-coated wire for spiral binders, lacing wire, and stiffeners used to assemble the product. The metallic-coated fabric may be polyvinyl chloride (PVC) coated after fabrication. The spiral binders, lacing wire, and stiffeners may be PVC coated after metallic coating. Polyvinyl chloride hereinafter will be designated as PVC.

1.2 Welded wire fabric for gabions and gabion mattresses is produced in five styles, based on the kind of coating, as described in Section 4.

1.3 The values stated in inch-pound 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 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 185 Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement³

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products⁴

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 809 Specification for Aluminum Coated (Aluminized) Steel Wire²

A 853 Specification for Steel Wire, Carbon, for General Use⁴

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 Practice for Operating Salt Spray (Fog) Testing Apparatus⁵

D 638 Test Method for Tensile Properties of Plastics⁶

D 746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact⁶

D 792 Test Method 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 Hardness⁷

G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials⁸

3. Terminology

3.1 *Definitions*—Refer to Terminology A 902 for general terminology relating to metallic-coated steel products.

3.2 *Definitions of Terms Specific to This Standard:*

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 01.04.

⁴ Annual Book of ASTM Standards, Vol 01.03.

⁵ Annual Book of ASTM Standards, Vol 03.02.

⁶ Annual Book of ASTM Standards, Vol 08.01.

⁷ Annual Book of ASTM Standards, Vol 09.01.

⁸ Annual Book of ASTM Standards, Vol 14.02.

3.2.1 *gabion, n*—a wire fabric container, uniformly partitioned, of variable size, interconnected with other similar containers, and filled with stone at the site of use, to form flexible, permeable, monolithic structures such as retaining walls, sea walls, channel linings, revetments, and weirs for erosion control (see Fig. 1). Typical gabion sizes are shown in Table 1.

3.2.2 *gabion mattress, n*—a gabion with relatively small height in relation to the lateral dimensions, generally used for lining channels (see Fig. 2). Typical gabion mattress sizes are shown in Table 2.

3.2.3 *lacing wire, n*—for gabions and gabion mattresses, a metallic-coated steel wire or metallic-coated steel wire with PVC coating used to assemble and interconnect empty gabion units, and to close and secure stone-filled units, used as an alternate to spiral binders.

3.2.4 *spiral binder, n*—for gabions and gabion mattresses, a length of metallic-coated steel wire or metallic-coated steel wire with PVC coating preformed into a spiral, used to assemble and interconnect empty gabion units, and to close and secure stone-filled units, used as an alternate to lacing wire.

3.2.5 *stiffener, n*—for gabions, a length of metallic-coated steel wire or metallic-coated steel wire with PVC coating used for support by forming a diagonal brace across the corners, inside of the gabion container. Stiffeners are produced using lacing wire for on-site applications or shipped preformed using heavier wire gage as shown in Table 3.

3.2.6 *welded wire fabric, n*—material composed of a series of longitudinal and transverse steel wires arranged substantially at right angles to each other, and welded together at the points of intersection by electrical resistance welding to form fabricated sheets.

4. Classification

4.1 Welded wire gabions are classified according to coating, as follows:

4.1.1 *Style 1*, consists of welded wire fabric made from wire which is zinc-coated before being welded into fabric. Spiral binders, lacing wire, and stiffeners are produced from zinc-coated wire.

4.1.2 *Style 2*, consists of welded wire fabric which is made from uncoated wire and the fabric is subsequently zinc-coated after fabrication. Spiral binders, lacing wire, and stiffeners are produced from zinc-coated wire.

4.1.3 *Style 3*, consists of welded wire fabric made from wire which is coated with zinc-5 % aluminum-mischmetal alloy (Zn-5Al-MM) before being welded into fabric. Spiral binders, lacing wire, and stiffeners are also produced from zinc-5 % aluminum-mischmetal alloy (Zn-5Al-MM) coated wire.

4.1.4 *Style 4*, consists of welded wire fabric made from wire which is aluminum-coated before being welded into fabric. Spiral binders, lacing wire, and stiffeners are also produced from aluminum-coated (aluminized) wire.

4.1.5 *Style 5*, consists of welded wire fabric, spiral binders, lacing wire, and stiffeners as Styles 1, 2, 3, or 4, and overcoated with PVC.

5. Ordering Information

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

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

5.1.2 Gabions or gabion 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 Note 2), and

5.1.7 Certification, if required (see 15.1).

NOTE 1—A typical ordering description is as follows: 100 gabions, 6 by 3 by 3 ft, as shown on plans; Style 1, 2, 3, or 4; with required spiral binders, lacing wire, and stiffeners; conforming to ASTM A 974.

6. Material and Manufacture

6.1 The wire used in the manufacture of welded wire fabric for use in gabions shall conform to the specifications in 6.1.1 as appropriate for the style ordered, except the tensile strength shall conform to 7.1. The wire may be produced from any grade of steel listed in Specification A 853.

6.1.1 Style 1 welded wire fabric shall be manufactured from zinc-coated steel wire conforming to Specification A 641. Style 2 welded wire fabric shall be manufactured from uncoated steel wire conforming to Specification A 853, and the fabric subsequently zinc-coated by the hot-dip process. Style 3 welded wire fabric shall be manufactured from Zn-5Al-MM coated steel wire conforming to Specification A 856/A 856M. Style 4 welded wire fabric shall be manufactured from aluminum-coated steel wire conforming to Specification A 809.

6.2 Spiral binders, lacing wire, and stiffeners shall be made of wire having a tensile strength in accordance with 7.1, having the same coating material as the welded wire fabric furnished on the order, and conforming to Specification A 641, A 856/A 856M, or A 809, as appropriate.

6.3 Wire for welded wire fabric shall be assembled by automatic machines or other suitable mechanical means that will ensure accurate spacing and alignment of all members of the finished fabric. Longitudinal and transverse members of the welded wire fabric shall be connected at every intersection in accordance with the requirements of 7.2.

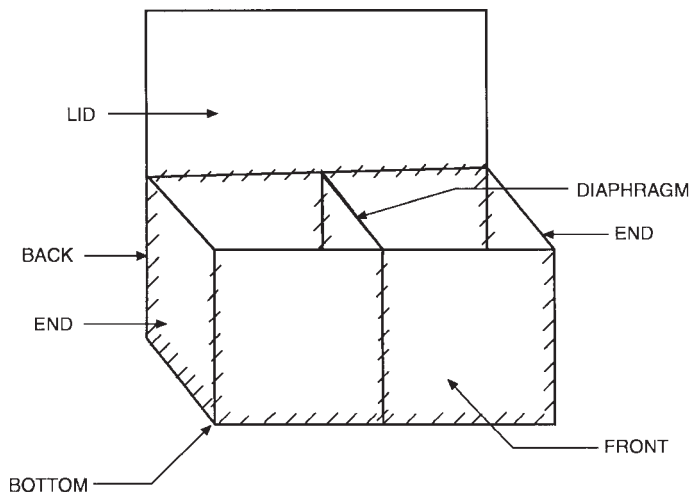


FIG. 1 Gabion

TABLE 1 Typical Gabion Sizes

Length, ft (cm)	Width, ft (cm)	Height, ft (cm)	Number of Cells	Capacity, yd ³ (m ³)
6 (182.9)	3 (91.4)	3 (91.4)	2	2.0 (1.53)
9 (274.3)	3 (91.4)	3 (91.4)	3	3.0 (2.29)
12 (365.8)	3 (91.4)	3 (91.4)	4	4.0 (3.06)
6 (182.9)	3 (91.4)	1.5 (45.7)	2	1.0 (0.765)
9 (274.3)	3 (91.4)	1.5 (45.7)	3	1.5 (1.15)
12 (365.8)	3 (91.4)	1.5 (45.7)	4	2.0 (1.53)
6 (182.9)	3 (91.4)	1 (30.5)	2	0.66 (0.50)
9 (274.3)	3 (91.4)	1 (30.5)	3	1.0 (0.765)
12 (365.8)	3 (91.4)	1 (30.5)	4	1.33 (1.02)

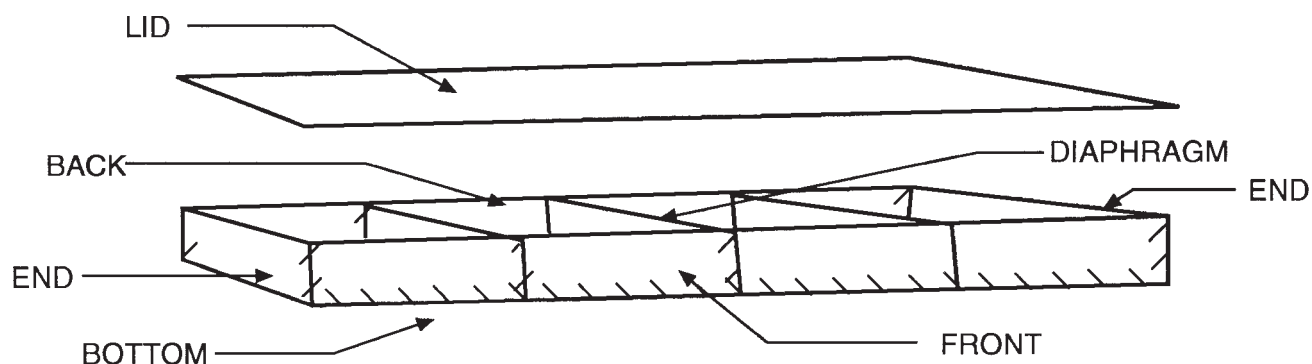


FIG. 2 Gabion Mattress

TABLE 2 Typical Gabion Mattress Sizes

Length, ft (cm)	Width, ft (cm)	Height, ft (cm)	Number of Cells	Area, yd ² (m ²)
9 (274.3)	6 (182.9)	0.5 (15.2)	3	6.0 (5.2)
12 (365.8)	6 (182.9)	0.5 (15.2)	4	8.0 (6.69)
9 (274.3)	6 (182.9)	0.75 (22.9)	3	6.0 (5.2)
12 (365.8)	6 (182.9)	0.75 (22.9)	4	8.0 (6.69)
9 (274.3)	6 (182.9)	1.0 (30.0)	3	6.0 (5.2)
12 (365.8)	6 (182.9)	1.0 (30.0)	4	8.0 (6.69)

TABLE 3 Wire Diameters

	Minimum Nominal Diameter, Metallic-Coated Wire, in. (mm) ^A	Minimum Diameter PVC-Coated Wire (Including Coating), in. (mm) ^B	Nominal Diameter, PVC-Coated Wire (Including Coating), in. (mm) ^C
Wire for PVC-coated gabions	0.106 (2.7)	0.136 (3.5)	0.146 (3.7)
Wire for metallic-coated gabions	0.120 (3.05)	N/A	N/A
Wire for gabion mattresses	0.087 (2.2)	0.117 (3.0)	0.127 (3.2)
Spiral binders for gabions:			
PVC-coated	0.106 (2.7)	0.136 (3.5)	0.146 (3.7)
Metallic-coated	0.120 (3.05)	N/A	N/A
Spiral binders for gabion mattresses, metallic- or PVC-coated	0.087 (2.2)	0.117 (3.0)	0.127 (3.2)
Lacing wire	0.087 (2.2)	0.117 (3.0)	0.127 (3.2)
Stiffeners:			
Lacing wire	0.087 (2.2)	0.117 (3.0)	0.127 (3.2)
Preformed	0.120 (3.05)	0.150 (3.8)	0.160 (4.0)

^AThe metallic-coated wire shall have the size tolerances in accordance with Specifications A 641, A 856/A 856M, and A 809, as applicable.

^BThe minimum thickness of PVC which covers the wire shall be 15 mils (0.015 in. or 0.38 mm), measured radially at any cross section transverse to the wire length.

^CThe nominal thickness of PVC which covers the wire shall be 20 mils (0.020 in. or 0.51 mm), measured radially at any cross section transverse to the wire length.

electric resistance welding, which employs the principle of fusion combined with pressure.

6.4 The PVC coating used in the manufacture of PVC-coated gabions and gabion mattresses shall conform to the properties in 8.2 and 8.3

6.4.1 The PVC-coated welded wire fabric shall have the PVC coating fused and bonded onto the metallic-coated welded wire fabric after fabrication of mesh. No cutting of the

panels closer than $\frac{1}{4} \pm \frac{1}{8}$ in. (6 ± 3.18 mm) to the weld shall be permitted after fabrication in order to prevent exposure near the welds.

6.4.2 The PVC-coated wire for spiral binders, lacing wire, and stiffeners shall have the PVC coating fused and bonded or extruded and adhered, onto the metallic-coated wire.

6.5 Gabions and gabion mattresses shall be manufactured with all components mechanically connected at the production