State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER	PAGE
09110245	1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
BUYER 33
304-558-2402

VENDOR
RFQ COPY
TYPE NAME/ADDRESS HERE
JMD COMPANY
6010 MACCORKLE AVE.
ST. ALBANS, WV 25177

SHIP TO
DIVISION OF HIGHWAYS
DISTRICT NINE
103 1/2 CHURCH STREET
LEWISBURG, WV
24901 304-647-7457

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
12/13/2010				

BID OPENING DATE: 12/29/2010 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
				ADDENDUM NO. 1		
				THIS ADDENDUM IS ISSUED TO ATTACHED THE FOLLOWING DOCUMENTS TO THE BID 1.) PURCHASING AFFIDAVIT FORM 2.) RESIDENT VENDOR PREFERENCE FORM		
				********** END ADDENDUM NO. 1**********		
0001	60	EA	570-68	TERRA AQUA GALV. GABION EACH, GABION BASKETS 12'X6'X1' 20 EA PER BUNDLE	91.87 EA.	5,512.20
0002	300	EA	570-68	EACH, GABION BASKETS 6'X3'X3' 50 PER BUNDLE	65.06 EA.	19,518.00
0003	150	EA	570-68	EACH, GABION BASKETS 6'X3'X1'6" 50 PER BUNDLE	46.74 EA.	7,011.00

RECEIVED
2010 DEC 22 PM 2:26
WV PURCHASING DIVISION

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE Daniel R Kelly TELEPHONE (304) 766-7404 DATE 12/22/10

TITLE MANAGER FEIN 250578730

ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

GENERAL TERMS & CONDITIONS
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)

1. Awards will be made in the best interest of the State of West Virginia.

2. The State may accept or reject in part, or in whole, any bid.

3. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required $125 fee.

4. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods this Purchase Order/Contract becomes void and of no effect after June 30.

5. Payment may only be made after the delivery and acceptance of goods or services.

6. Interest may be paid for late payment in accordance with the ***West Virginia Code***.

7. Vendor preference will be granted upon written request in accordance with the ***West Virginia Code***.

8. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

9. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.

10. The laws of the State of West Virginia and the ***Legislative Rules*** of the Purchasing Division shall govern the purchasing process.

11. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.

12. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.

13. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, is available online at **www.state.wv.us/admin/purchase/vrc/hipaa.htm** and is hereby made part of the agreement. Provided that the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.

14. **CONFIDENTIALITY:** The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf.

15. **LICENSING:** Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, and the West Virginia Insurance Commission. The vendor must provide all necessary releases to obtain information to enable the director or spending unit to verify that the vendor is licensed and in good standing with the above entities.

16. **ANTITRUST:** In submitting a bid to any agency for the State of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the State of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, or person or entity submitting a bid for the same material, supplies, equipment or services and is in all respects fair and without collusion or Fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division. Complete all sections of the quotation form.

2. Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.

3. Unit prices shall prevail in case of discrepancy. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.

4. All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130

5. Communication during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited (W.Va. C.S.R. §148-1-6.6).

State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

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24901 304-647-7457

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12/13/2010				

BID OPENING DATE: 12/29/2010 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
	****** THIS IS THE END OF RFQ 09110245 ****** TOTAL:					32,041.20

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE Daniel R. Kelley TELEPHONE (304) 766-7404 DATE 12/22/10

TITLE MANAGER FEIN 2505 78730 ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

State of West Virginia
Department of Administration
Purchasing Division
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Post Office Box 50130
Charleston, WV 25305-0130

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DISTRICT NINE

103 1/2 CHURCH STREET
LEWISBURG, WV
24901 304-647-7457

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B	FREIGHT TERMS
12/07/2010				

BID OPENING DATE: 12/29/2010 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT

I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.

ADDENDUM NO.'S:

NO. 1 ..✓...

NO. 2 .....

NO. 3 .....

NO. 4 .....

NO. 5 .....

I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF BIDS.

VENDOR MUST CLEARLY UNDERSTAND THAT ANY VERBAL REPRESENTATION MADE OR ASSUMED TO BE MADE DURING ANY ORAL DISCUSSION HELD BETWEEN VENDOR'S REPRESENTATIVES AND ANY STATE PERSONNEL IS NOT BINDING. ONLY THE INFORMATION ISSUED IN WRITING AND ADDED TO THE SPECIFICATIONS BY AN OFFICIAL ADDENDUM IS BINDING.

Daniel R Kelley
SIGNATURE

JMD COMPANY
COMPANY

12/22/10
DATE

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
Daniel R Kelley	(304) 766-7404	12/22/10

TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
MANAGER	250578730	

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

Designation: A 975 – 97 (Reapproved 2003)

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 brackets 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 Coating[2]

A 313 Specification for Chromium-Nickel Stainless and Heat-Resisting Steel Spring Wire[3]

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products[3]

A 428 Test Method for Weight of Coating on Aluminum Coated Iron and Steel Articles[2]

A 641 Specification for Zinc Coated (Galvanized) Carbon Steel Wire[2]

A 764 Specification for Steel Wire, Carbon, Drawn Galvanized and Galvanized at Size for Mechanical Springs[3]

A 809 Specification for Aluminum-Coated (Aluminized) Carbon Steel Wire[2]

A 856/A 856M Specification for Zinc-5% Aluminum-Mischmetal Alloy-Coated Carbon Steel Wire[2]

A 902 Terminology Relating to Metallic Coated Steel Products[2]

B 117 Test Method of Salt Spray (Fog) Testing[4]

D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension[5]

D 746 Test Method for Brittleness Temperature of Plastics and Elastomers by Impact[6]

D 792 Test Methods for Specific Gravity (Relative density) and Density of Plastics by Displacement[6]

D 1242 Test Methods for Resistance of Plastic Materials to Abrasion[6]

D 1499 Practice for Operating Light-and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Plastics[6]

D 2240 Test Method for Rubber Property-Durometer Hardness[5]

G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials[7]

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 A05 on Metallic Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.12 on Wire Specifications.

Current edition approved May 10, 2003. Published June 2003. Originally approved in 1997. Last previous edition approved in 1997 as A 975 - 97.

[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 throughout 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-5A1-MM*—zinc-5 % aluminum-mischmetal alloy.

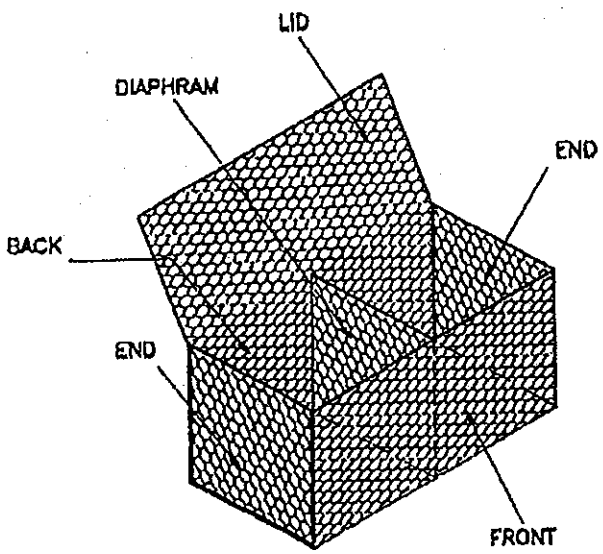


FIG. 1 Gabion

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-5A1-MM before being double-twisted into mesh. Fasteners, lacing wire, and stiffeners are also produced from Zn-5A1-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-5A1-MM-coated steel wire conforming to Specification A 856/A 856M, Class 3 coating, soft temper.

6.1.3 Style 3 double-twised 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.

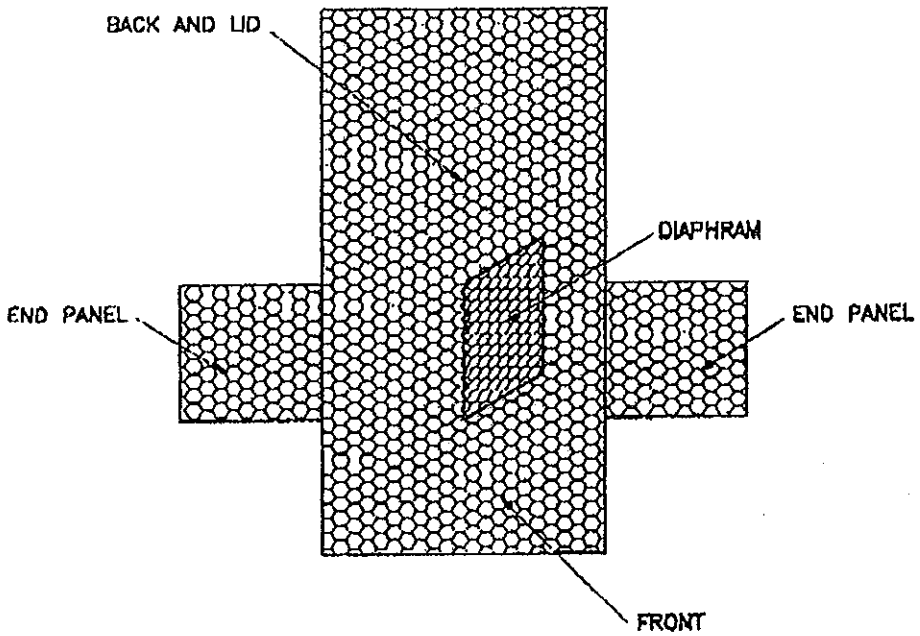


FIG. 2 Mechanically Manufactured Gabion

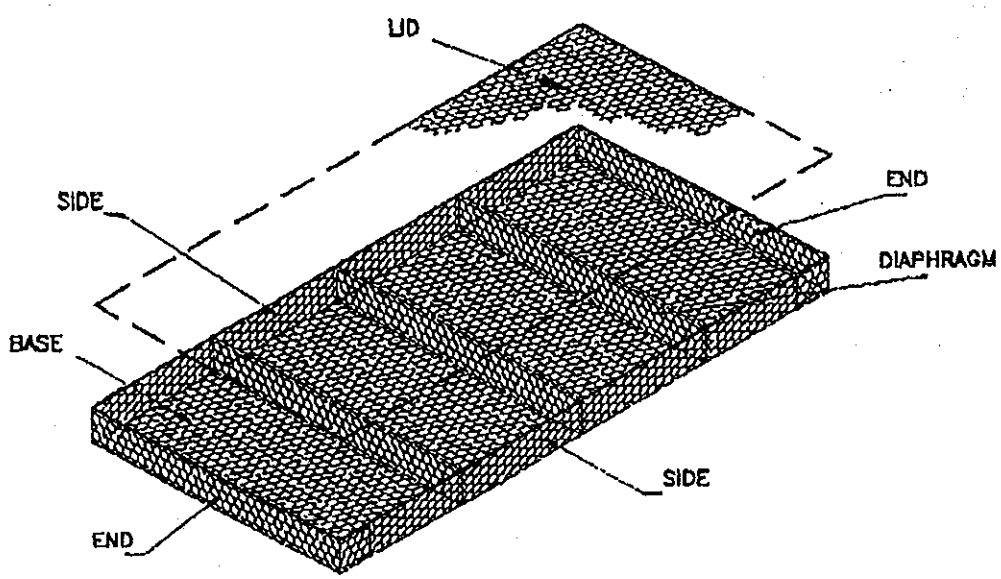


FIG. 3 Revet Mattress

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.

TABLE 1 Mesh Characteristics[A]

Characteristics	Gabion		Revet Mattresses	
	Metallic Coated	PVC Coated	Metallic Coated	PVC Coated
Mesh Type	8 by 10		6 by 8	
Mesh Opening	83 by 114 mm [3.25 by 4.5 in.]	83 by 114 mm [3.25 by 4.5 in.]	64 by 83 mm [2.5 by 3.25 in.]	64 by 83 mm 2.5 by 3.25 in.]
Mesh wire	3.05 mm [0.120 in.]	2.7 mm [0.106 in.]	2.2 mm [0.087 in.]	2.2 mm [0.087 in.]
Selvedge wire	3.8 mm [0.150 in.]	3.4 mm [0.134 in.]	2.7 mm [0.105 in.]	2.7 mm [0.105 in.]
Lacing wire	2.2 mm [0.087 in.]	2.2 mm [0.087 in.]	2.2 mm [0.087 in.]	2.2 mm [0.087 in.]
Fasteners	3.0 mm [0.118 in.]	3.0 mm [0.118 in.]	3.0 mm [0.118 in.]	3.0 mm [0.118 in.]
Stiffeners:				
Using lacing wire	2.2 mm [0.087 in.]	2.2 mm [0.087 in.]	2.2 mm [0.087 in.]	2.2 mm [0.087 in.]
Preformed	3.8 mm [0.150 in.]	3.4 mm [0.134 in.]	N/A	N/A
PVC coating thickness:				
Nominal	N/A	0.50 mm [0.02 in.]	N/A	0.50 mm [0.02 in.]
Minimum	N/A	0.38 mm [0.015 in.]	N/A	0.38 mm [0.016 in.]

[A]All dimensions and wire diameters are minimum nominal values.

7. Mechanical Properties

7.1 *Tensile Strength*— The tensile strength of wire used for double-twisted mesh, lacing wire, and stiffener, when tested in accordance with Test Methods and Definitions A 370, shall be in accordance with the requirements of Specification A 641, A 809, and A 856/A 856M for soft temper wire.

7.2 *Fasteners*—The tensile strength of zinc-coated steel wire, zinc-5 % aluminum mischmetal alloy-coated steel wire and aluminum-coated steel wire used for fasteners shall be in accordance with the requirements of Specification A 764, Type A, B, or C, Table 2 or Table 3. The tensile strength of stainless steel wire used for fasteners shall be in accordance with the requirements of Specification A 313, Type 302, Table 2. Any fastener system shall give the number of fasteners required to comply with Table 2 in accordance with the pull-part resistance test (see 13.1.2). The manufacturer or supplier shall state the number of fasteners required for all vertical and horizontal connections for single- and multiple-basket joinings and shall include a description of a properly installed fastener including drawings or photographs.

TABLE 2 Minimum Strength Requirements of Mesh and Connections

Test Description	Gabions, Metallic Coated		Gabion, PVC Coated		Revet Mattress Metallic Coated and PVC Coated	
	kN/m	[lbf/ft]	kN/m	[lbf/ft]	kN/m	[lbf/ft]
Parallel to twist	51.1	[3500]	42.3	[2900]	33.6	[2300]
Perpendicular to twist	26.3	[1800]	20.4	[1400]	13.1	[900]
Connection to selvedges	20.4	[1400]	17.5	[1200]	10.2	[700]
Panel to panel connection using lacing wire or fasteners	20.4	[1400]	17.5	[1200]	10.2	[700]
	kN	[lbf]	kN	[lbf]	kN	[lbf]
Punch Test	26.7	[6000]	23.6	[5300]	17.8	[4000]

7.3 *Mesh and Panel to Panel Joint Strength*—The minimum strength requirements of the mesh, selvedge wire to mesh connection, panel to panel connection, and punch test, when tested in accordance with 13.1, shall be as shown in Table 2.

8. Physical Properties

8.1 *Metallic Coating*— The coating weights shall conform to the requirements of Specification A 641, Class 3, for zinc coating or Specification A 856/A 856M, Class 3, for Zn-5A1-MM coating, or Specification A 809 for aluminum coating.

8.2 *PVC for Coating*— The initial properties of PVC coating material shall have a demonstrated ability to conform to the following requirements:

8.2.1 *Specific Gravity*— In the range from 1.30 to 1.35 when tested in accordance with Test Method D 792.

8.2.2 *Tensile Strength*— Not less than 20.6 MPa [2985 psi] when tested in accordance with Test Methods D 412.

8.2.3 *Modulus of Elasticity*—Not less than 18.6 MPa [2700 psi] when tested in accordance with Test Methods D 412.

8.2.4 *Hardness*—Shore" D" between 50 and 60, when tested in accordance with Test Method D 2240.

8.2.5 *Brittleness Temperature*—Not higher than −9°C [15°F], or lower temperature when specified by the purchaser, when tested in accordance with Test Method D 746 (see Note 2).

NOTE 2—The maximum brittleness temperature should be at least 8°C [15°F] below the minimum temperature at which the gabions will be filled.

8.2.6 *Resistance to Abrasion*—The percentage of the weight loss shall be less than 12 %, when tested in accordance with Test Method D 1242.

8.2.7 *Salt Spray Exposure and Ultraviolet Light Exposure*:

8.2.7.1 The PVC shall show no effect after 3000 h of salt spray exposure in accordance with Test Method B 117.

8.2.7.2 The PVC shall show no effect of exposure to ultraviolet light with test exposure of 3000 h, using apparatus Type E and 63°C [145°F], when tested in accordance with Practice D 1499 and G 23.

8.2.7.3 *Evaluation of Coating After Salt Spray and Ultraviolet Exposure Test*—After the salt spray test and exposure to ultraviolet light as specified in 8.2.7.1 and 8.2.7.2, the PVC coating shall not show cracks nor noticeable change of color, or blisters or splits. In addition, the specific gravity, tensile strength, hardness, and resistance to abrasion shall not change more than 6 %, 25 %, 10 %, and 10 %, respectively, from their initial values.

8.2.8 The PVC coating shall not show cracks or breaks after the wires are twisted in the fabrication of the mesh.

8.3 *Salt Spray Resistance for Fastener*—After testing in accordance with 13.1.3, the fasteners, the selvedge, or mesh wire confined by the fasteners shall show no rusty spots on any part of the surface excluding the cut ends.

9. Dimensions and Tolerances

9.1 The diameter of metallic coated wire shall conform to Table 1 plus or minus the tolerances shown in Specifications A 641, A 856/A 856 M, and A 809, as applicable.

9.2 The diameter of metallic-coated wire and stainless steel wire used in the fabrication of fasteners shall conform to Table 7 plus or minus the tolerances shown in Specification A 764.

9.3 The minimum and nominal thickness of PVC coating uniformly applied in a quality workmanlike manner shall be as shown in Table 1.

9.4 Gabions shall be manufactured with an 8 by 10-mesh type having a nominal mesh opening of 83 by 114 mm [3.25 by 4.5 in.]. Dimensions are measured at right angles to the center axis of the opening (D = 83 mm, see Fig. 4) and parallel to the twist along the same axis.

9.5 Revet mattresses shall be manufactured with a 6 by 8-mesh type having a nominal mesh opening of 64 by 83 mm [2.5 by 3.25 in.]. Dimensions are measured at right angles to the center axis of the opening (D = 64 mm, see Fig. 4) and parallel to the twist along the same axis.

9.6 The width, height, and length of the gabion as manufactured shall not differ more than ±5 % from the ordered size prior to filling. (Typical gabion sizes are shown in Tables 3 and 4).

9.7 The width and length of the revet mattress as manufactured shall not differ more than ±5 %, and the height shall not differ more than ±10 % from the ordered size prior to filling. (Typical revet mattress sizes are shown in Tables 5 and 6).

9.8 *Mesh Opening Tolerances*—Tolerances on the hexagonal, double-twisted wire mesh opening shall not exceed ±10 % on the nominal dimension D values, as follows (see Fig. 4):

Mesh Type	Nominal Dimension D Values
6 by 8	64 mm [2.50 in.]
8 by 10	83 mm [3.25 in.]

10. Workmanship

10.1 Wire of proper grade and quality, when fabricated in the manner herein required, shall result in a strong, serviceable mesh-type product having substantially uniform openings. It shall be fabricated and finished in a workmanlike manner, as determined by visual inspection, and shall conform to this specification.

11. Sampling

11.1 Samples for determining the mechanical and physical properties of double-twisted wire mesh shall be in accordance with the samples, dimensions, and requirements described in Section 13.

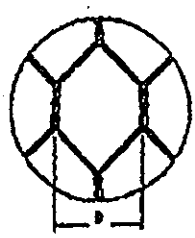


FIG. 4 Wire Mesh Opening Nominal Dimension D

TABLE 3 Typical Gabion Sizes (SI Units)

Length, m	Width, m	Height, m	Number of Cells, each	Volume, m^3
2.0	1.0	1.0	2.0	2.0
3.0	1.0	1.0	3.0	3.0
4.0	1.0	1.0	4.0	4.0
2.0	1.0	0.5	2.0	1.0
3.0	1.0	0.5	3.0	1.5
4.0	1.0	0.5	4.0	2.0
2.0	1.0	0.3	2.0	0.6
3.0	1.0	0.3	3.0	0.9
4.0	1.0	0.3	4.0	1.2

TABLE 4 Typical Gabion Sizes (Inch-Pound Units)

Length, ft	Width, ft	Height, ft	Number of Cells, Each	Volume, yd^3
6.0	3.0	3.0	2.0	2.0
9.0	3.0	3.0	3.0	3.0
12.0	3.0	3.0	4.0	4.0
6.0	3.0	1.5	2.0	1.0
9.0	3.0	1.5	3.0	1.5
12.0	3.0	1.5	4.0	2.0
6.0	3.0	1.5	2.0	0.67
9.0	3.0	1.0	3.0	1.0
12.0	3.0	1.0	4.0	1.33

TABLE 5 Typical Revet Mattress Sizes (SI Units)

Length, m	Width, m	Height, m	Number of Cells, Each	Area, m^2
3.0	2.0	0.17	3.0	6.0
4.0	2.0	0.17	4.0	8.0
3.0	2.0	0.23	3.0	6.0
4.0	2.0	0.23	4.0	8.0
3.0	2.0	0.3	3.0	6.0
4.0	2.0	0.3	4.0	8.0

TABLE 6 Typical Revet Mattress Sizes (Inch-Pound Units)

Length, ft	Width, ft	Height, ft	Number of Cells, Each	Area, yd^2
9.0	6.0	0.5	3.0	6.0
12.0	6.0	0.5	4.0	8.0
9.0	6.0	0.75	3.0	6.0
12.0	6.0	0.75	4.0	8.0
9.0	6.0	1.0	3.0	6.0
12.0	6.0	1.0	4.0	8.0

11.2 Samples for determining the mechanical and physical properties of coated steel wire used for mesh, lacing wire, and stiffeners shall be selected at random from wire coils used for manufacturing.

12. Number of Tests

12.1 A minimum of three tests each for conformance to strength of metallic-coated steel wire mesh parallel to twist, perpendicular to twists, connection of metallic-coated steel wire mesh to selvedge, and punch test shall be performed. A retest for conformance with the aforementioned strength and connection tests shall be required when changes of the physical characteristics of the mesh products occur. For metallic-coated steel wire with PVC coating, follow the same requirements as for the metallic-coated steel wire mesh. The results of all three tests must meet the requirements of Table 2.

12.2 The tensile strength, metallic coating weight, and PVC coating thickness of the metallic steel wire used in the fabrication of mesh, lacing wire, stiffeners, and fasteners must be certified by the steel wire producers for conformance to the requirements of Sections 6 and 7 and Table 1 for each lot shipment to the gabion manufacturer's facility.

13. Test Methods

13.1 *Mechanical Property Tests*:

13.1.1 *Tensile Strength Test*—The wire mesh specimens shall be representative of proper field construction as to materials, mesh geometry, and workmanship, and shall be as large as practical to minimize the effect of variations. The width of a specimen shall not be less than seven repetitions of a mesh pattern, nor shall the length be less than fourteen repetitions. The tests shall be run with the load applied parallel to the axis of twist and repeated on a separate test specimen with the load applied perpendicular to the axis of twist.

13.1.1.1 The apparatus shall grip the wire in such a manner as to allow the wire failures to occur at least one mesh pattern away from the gripping points. If a failure occurs in a wire leading directly to a gripping point that specimen shall be rejected, and not included among the tests reported.

13.1.1.2 Insert the wire into the machine grips and the axially free sliding adjustable spreader system attachment points such that the gripped wires will be maintained in the mesh geometry characteristic of field use and attached in such a manner as to eliminate failure at the grips. The grips may be left loose until the preload is applied to allow the wires to seat. The load is then applied at a uniform rate not to exceed 50 nor 3 % of the mesh ultimate strength per second (see Table 2). The load shall initially be taken to a preload of 20 % of the specified minimum strength and the machine head travel stopped. The mesh gage dimensions shall be recorded at this time and taken as the initial dimensions of the specimen where such dimensions are required. Loading shall then continue uniformly in increments of 10 % of the specified minimum strength until first fracture or unwrapping of an individual wire in the system occurs. The machine head travel at each load increment or sequential incident of wire failure may be stopped for recording pertinent information such as load, fracture type, resulting mesh geometry and elongation, and resulting reduction in wire gage. The distortion of the mesh or changes in gage length shall be measured to an accuracy consistent with reporting the percent elongation to the nearest 0.5 %. The results of the tests shall be in accordance with the requirements shown in Table 2.

13.1.2 *Pull-Apart Resistance Test*—A set of the jointed panels, which are prepared by the same method as specified in the salt spray test but without being subject to the 48-h salt spray test, shall be mounted on a loading machine with grips or clamps such that the panels are uniformly secured along the full width. The grips or clamps shall be designed to only transmit tension forces. The load will then be applied at a uniform rate not to exceed 220 N/s [50 lb/s] until failure occurs. The failure is defined as when the maximum load is reached and a drop of strength is observed with subsequent loading or alternately the opening between any two closest selvedge wires, applicable to a fastener confining either two or four selvedge wires, becomes greater than 50 mm [2 in.] at any place along the panel width. The strength requirements of the jointed panels at failure shall be as shown in Table 2.

13.1.3 *Salt Spray Test*— A set of two identical rectangular gabion panels, each with a width about 10½ mesh openings along a selvedge wire, shall be jointed by properly installed wire fasteners along the two selvedge wires so that each fastener confines two selvedge and two mesh wires. If the fasteners are also to be used to join two individual empty gabion baskets, two additional selvedge wires that are each mechanically wrapped with mesh wires shall be included so that each fastener confines four selvedge and four mesh wires. A properly installed fastener shall meet the following requirements:

13.1.3.1 Each interlocking fastener type shall be in a locked and closed position. Each overlapping fastener type shall be closed and the free ends of the fastener shall overlap a minimum of 1 in. The set of the jointed panels shall be subject to Salt Spray Test of Test Method B 117 for a period of not less than 48 ± 1 h cycle length.

13.1.4 *Punch Test*—An uncut section of 1.82 m [6 ft] in length (unselvedged) and not less than 0.91 m [3 ft] in width (selvedged), including all selvedge bindings, shall have the ends securely clamped for 0.91 m along the width of the sample. When the width of the section under test exceeds 0.91 m, the clamps shall be centered along the width and the excess width will be allowed to fall free on each side of the clamped section. The sample shall then be subjected to tension sufficient to cause 10 % elongation of the sample section between the clamps. After elongation and while clamped as described above (and otherwise unsupported), the section shall be subjected to a load applied to a 1-ft^2 area applied to an area of 900 cm^2 [1 ft^2] in the approximate center of the sample section between the clamps and in a direction perpendicular to the direction of the tension force. The sample shall withstand, without rupture of any strand or opening of any mesh fastening, an actual load applied by means of a circular ram at a rate as indicated in 13.1.2 equaling or exceeding the values shown in Table 2. The ram head used in the test shall be circular with a 305-mm [12-in.] diameter and have its edges beveled or rounded to prevent cutting of the wire strands.

13.2 *Metallic Coating Weight*—Perform coating weight tests as prescribed in Test Methods A 90/A 90M or A 428 as applicable.

13.3 *PVC Coating Thickness*:

13.3.1 The thickness of the PVC coating shall be determined on a randomly chosen individual piece of wire removed from the mesh.

13.3.2 Measure with a micrometer the diameter of the metallic coated steel wire with PVC coating. Determine the thickness of the PVC coating by stripping the PVC coating from the wire and measure the reduced diameter with a micrometer. The thickness of the coating is the difference between the diameter of the metallic-coated steel wire with PVC coating and the measured diameter of the metallic-coated wire divided by two. This value shall be in accordance with Table 1. When removing the PVC coating by stripping, take care not to remove any of the metallic surface.

14. Inspection

14.1 Unless otherwise specified in the contract or purchase order, the producer is responsible for the performance of all inspection and test requirements of this specification. The producer shall use his own or any other suitable facilities for the performance of the inspection and test requirements, at his option, unless disapproved by the purchaser at the time the order is placed. The purchaser at their own expense shall have the right to perform any of the inspections and tests set forth in this specification when such tests are deemed necessary to ensure that the material conforms to the prescribed requirements.

15. Certification

15.1 When specified in the purchase order or contract, a producer's or supplier's certification that the material meets the contract specifications shall be furnished to the purchaser.

16. Keywords

16.1 double-twisted wire mesh; fasteners; gabions; lacing wire; metallic-coated mesh; metallic-coated steel wire; metallic-coated steel wire with PVC coating; prefonned stiffeners; revet mattresses; selvedge edge wire; stiffeners

TERRA AQUA
GALVANIZED GABION

Scope:

This specification data sheet covers the use of galvanized steel double twisted woven wire mesh gabion baskets filled with stone and used for various applications including but not limited to retaining walls, mechanically stabilized soil retaining structures, stream bank protection, slope paving, outfall structures, weirs, drop structures, etc...

Definition:

a) Gabions are defined as double twisted woven wire mesh box shaped baskets, of various sizes and dimensions.
b) The selvedges of the gabion baskets are the thicker perimeter and edge wires to which the wire mesh is secured as to withstand sudden or gradual stress from any direction.
c) Reinforcing wires are the thicker wires incorporated into the netting during fabrication.
d) The internal diaphragms are the internal wire mesh partitions which divide the gabions into cells.
e) Lacing or tie wire is used to assemble and join the gabion units.
f) Connecting wires are the internal wire used to prevent the gabions from bulging.
g) Alternative wire fasteners are ASTM approved wire fasteners used in lieu of lacing wire.

Fabrication:

Double Twisted Hexagonal steel wire mesh Galvanized Gabions. Gabions shall be fabricated in such a manner that the sides, ends, lid and diaphragms can be assembled at the construction site into rectangular baskets of the sizes specified and shown in the drawings. Gabions shall be of single unit construction: the base, lid, ends, and sides shall be either woven into a single unit or edge of these members connected to the base section of the gabion in such a manner that strength an flexibility at the connecting point does not compromise the engineered structural design of the gabion. Where the length of the gabion exceeds on an one half its horizontal width, the gabion shall be divided by diaphragms of the same mesh and gauge as the body of the gabion, into cells whose length does not exceed the horizontal width. The gabion shall be furnished with the necessary diaphragms secured in proper position on the base in such a manner that no additional tying is required at this juncture.

Mesh Formation:

The double twisted hexagonal wire mesh shall have deformability sufficient to permit minimum of mesh elongation equivalent to 10% of the unstretched length of the mesh test section without reducing the gauge or the tensile strength of the individual wire strands to values less than those for similar wire, one gauge smaller in diameter.

Non-Raveling:

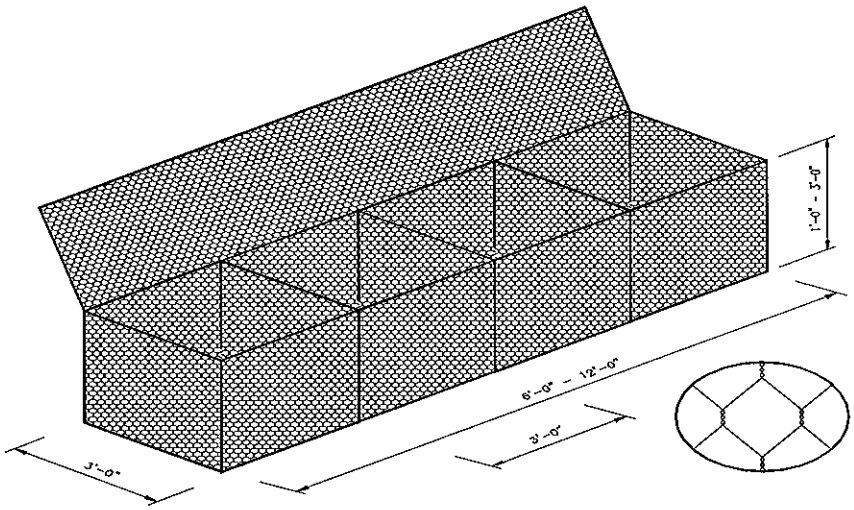
The double twisted hexagonal wire mesh is to be fabricated in such a manner as to be non raveling. This is defined as the ability to resist pulling apart at any of the twists or connections forming the mesh when a single wire strand in a section of mesh is cut or broken.

Gabion fill:

The stone fill material used for filling the gabion units shall be clean, hard stone with pieces ranging from 4 – 8 inches on the greatest dimensions. Stone filling shall not exceed 24 inch vertical drop above the gabion basket. All effort shall be made to ensure that the stone fill material utilized in the design of the structure match the stone fill used in constructing the gabion structure.

Assembling and placing:

a) Each gabion unit shall be assembled by tying or fastening all connecting seams. The binding wire shall be tightly looped around every other mesh opening along the seams in such a manner that single and double loops are alternated. An alternative wire fasteners may be used in lieu of lacing wire. The alternative wire fasteners shall be applied at approximately 4" – 6" intervals on all vertical and horizontal seams. No less than 3 fasteners per one foot on any given seam.
b) A line of empty gabions, shall be placed into position according to the contract drawings. Binding wire or alternative wire fasteners shall be used to secure each unit to the adjoining one along the vertical reinforced edges and the top selvedges. An approved corner closure tool shall be used to adjoin adjacent gabions to insure a tight, neat seam and minimize gabion wired or fastened to the latter at front and back. The lid shall be secured with an approved closure tool to insure proper closure without excessive mesh deformation.
c) To achieve optimum alignment and finish for retaining walls, a minimum amount of stretching may be required.
d) Connecting wire shall be inserted during the filling operation as follows: The connecting wires shall be installed according to manufacturers instructions every 1' vertical lift of the gabion unit.



Terra Aqua Gabion Unit Standard Sizes: Custom Jumbo Sizes Available

Gabion unit siz	*Capacity Cubic Yards*	*No. of Internal Cells*
6x3x3	2	2
9x3x3	3	3
12x3x3	4	4
6x3x1.5	1	2
9x3x1.5	1.5	3
12x3x1.5	2	4
6x3x1	.666	2
9x3x1	1	3
12x3x1	1.33	4

TOLERANCES: All gabion dimensions shall be within a tolerance limit of plus or minus 5% of the manufacturers stated dimensions.

Minimum Strength requirements of Terra Aqua Double Twisted Mesh Gabions

Test Description	*Galvanized/Galfan Gabion*	*Pvc Coated Gabion*
Tensile strength of wire mesh parallel to twist	3500 lbs/ft	2900 lbs/ft
Tensile strength of wire mesh perpendicular to twist	1800 lbs/ft	1400 lbs/ft
Connection to selvedges	1400 lbs/ft	1200 lbs/ft
Panel to Panel	1400 lbs/ft	1200 lbs/ft
Punch strength of mesh	6000 lbs/ft	5300 lbs/ft

Material data:

-diameter of mesh wire: 0.120 inches
-diameter of selvedge wire: 0.153 inches
-diameter of lacing wire: 0.091 inches
-coating of wire: finish 5 class 3 zinc coating- ASTM A-641 tested in accordance with ASTM A370-92.
-tensile of wire: soft temper in accordance with ASTM A641-92
-weight of zinc coating of wire: shall be determined by ASTM A-90
-wire diameter of 0.120 inches shall have a weight of zinc coating of: 0.85 oz/sf
-wire diameter of 0.153 inches shall have a weight of zinc coating of: 0.90 oz/sf
-wire diameter of 0.091 inches shall have a weight of zinc coating of: 0.80 oz/sf
-grade of zinc coating of wire: high grade or special high grade in accordance with ASTM B-6, Table 1
-uniformity of coating: shall be determined by ASTM A-239
-Elongation: not less than 12% in accordance with ASTM A370-92.

All of the above wire diameters are subject to a tolerance limit of 0.004 in accordance with ASTM A-641.

All Terra Aqua Gabion material is manufactured according to ASTM A975-97 guidelines for Double Twisted Hexagonal Mesh Gabions.

ASTM A975-97

TERRA AQUA GABIONS, INC.
1415 N. 32ND STREET
FORT SMITH AR 72904
479-785-5344

TERRA AQUA INC.

TECHNICAL SPECIFICA

Galvanized Reno Matt

General Description:

The Terra Aqua Reno mattress is a mattress shaped container manufactured from l wire to form a flexible and effective surface protection to defend against erosion flexible wire mesh will accommodate significant deformation without failure. The the Reno Mattress are made of a single sheet of wire mesh (main panel). Partition p are made of the same wire mesh as the main panel and are attached to the base dividing the Reno Mattress into 3 foot cells. The lid is formed either by a single sh specified length from the same wire as is in the main panel.

Mesh:

The mesh shall be woven into a hexagonal pattern with the joints formed by twi wires through three and a half turns. Because of this appearance, the joints are c twisted. The mesh opening shall be hexagonal in shape and uniform in size measur 31/4 inches.

Wire:

All wire used in the fabrication of the Reno Mattress and in the lacing operation Federal Specification QQ-W-461H, Class 3, Finish 5, soft, and have an average accordance with the current ASTM A 641, Table 2, measured before fabrication c nominal diameter of the wire used in the fabrication of the netting shall be 0.0866 subject to diameter tolerance in accordance with the current ASTM A 641, Table 3.

Elongation of Wire:

Tests shall be conducted on the wire before fabrication on the Reno Mattress on a long. Elongation shall not be less than 12%.

Zinc Coating (Galvanizing):

All wire used in the fabrication and construction of the gabions shall be galvar ASTM A 641, Table 1. The minimum weight of the zinc coating shall be acco following when tested in accordance with ASTM A 90.

Description	*Nominal Diameter of Wire*	*Minimum Wei Coating*
Mesh and Lacing	0.0866 inches (2.2mm) minimum	0.70 ozs / s
Selvedge	0.106 inches (2.7mm) minimum	0.80 ozs / s

RFQ No. 0911024S

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

West Virginia Code §5A-3-10a states: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

DEFINITIONS:
"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

EXCEPTION: The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

Under penalty of law for false swearing (***West Virginia Code*** §61-5-3), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: JMD Company

Authorized Signature: Daniel R Kelly Date: 12/22/10

State of WV

County of Kanawha, to-wit:

Taken, subscribed, and sworn to before me this 22nd day of December, 2010.

My Commission expires 1-10, 2015.

AFFIX SEAL HERE

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
SAMANTHA A. MILLER
BB&T
#4 RIVERWALK PLAZA
SOUTH CHARLESTON, WV 25303
My commission expires January 10, 2015

NOTARY PUBLIC