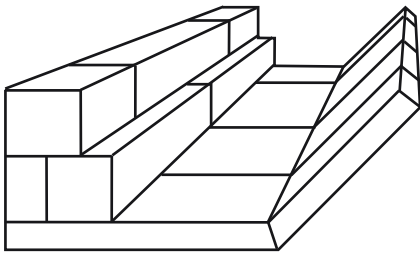


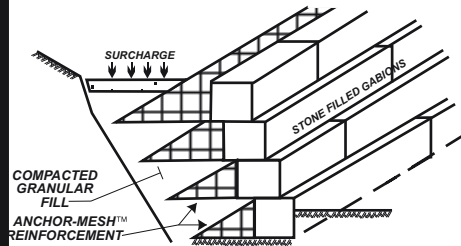
MODULAR GABION SYSTEMS

**Conforms to
ASTM A 974-97**

EROSION CONTROL SPECIALISTS

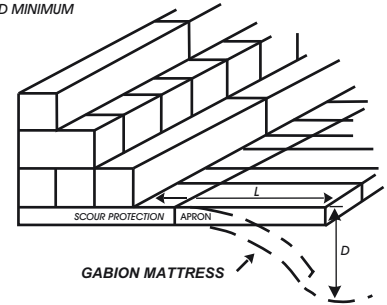


BANK AND CHANNEL PROTECTION

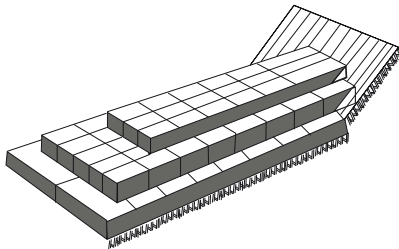


**ANCHOR-MESH™ REINFORCED
GABION RETAINING WALL**

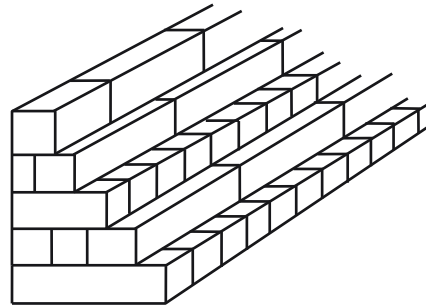
$D = \text{MAX. ANTICIPATED SCOUR DEPTH}$
 $L = 2 D \text{ MINIMUM}$



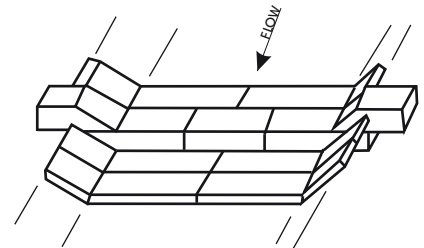
GABION SHORE DEFENSE



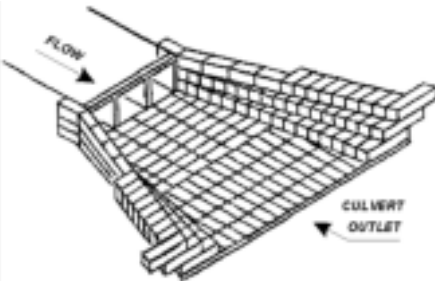
GABION GROINS AND JETTIES



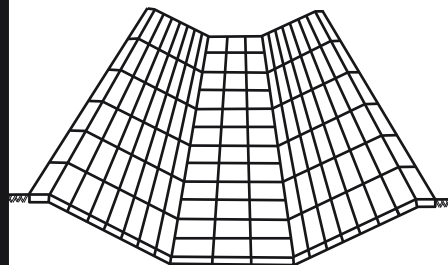
GABION RETAINING WALL



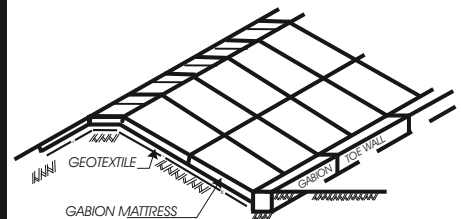
**GABION WEIR
OR
DROP STRUCTURE**



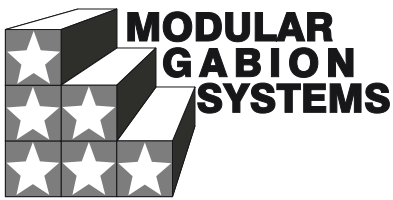
**CULVERT OUTLET
GABION PROTECTION**



GABION MATTRESS CHANNEL LINING



**LEVEE EMBANKMENT
DIKE AND SLOPE PROTECTION**



GABIONS are fabricated from precision welded corrosion-resistant steel wire mesh assembled into rectangular cells of varying size. Gabions are assembled on the job site, set into place and filled with stone to form a monolithic, flexible structure which provides low cost, long-term erosion control and soil stabilization. The high permeability of gabion systems eliminates buildup of hydrostatic pressure which will displace and crack concrete structures. Gabions conform to irregularities and dynamics of changing soil conditions without compromising performance.

Because of their inherent flexibility, gabion structures can yield to earth movement and retain their full efficiency while remaining structurally sound. They are quite unlike rigid or semi-rigid structures which may suffer complete failure when even slight changes occur in their foundations.

Highly permeable, the gabion structures act as self draining units which "bleed" off ground waters, relieving hydrostatic heads. Interstitial spaces between the stones dissipate the energy from flood, current, and wave action; so, the entire structure is, therefore, a "breathing," self-draining unit needing no additional drainage. Gabion efficiency, rather than decreasing with age, actually increases. During early periods of use, silt and vegetation will collect within the rock filling to form a naturally permanent structure, enhancing the *environment*.

One of the first gabion structures installed in Europe at the turn of the century for river works was examined after 75 years in service and found to be in perfect condition. From an economic perspective, finished gabion work is invariably less expensive than a conventional structure. The cost of gabions and stone fill is nominal; unskilled laborers can be used in construction; the high cost of underwater excavations, driving piling, underground drainage systems and so on is avoided. Construction speed is hastened because no forms, reinforcements, setting or curing time are necessary. Gabions are virtually maintenance free.

MODULAR GABION SYSTEMS are supplied in three configurations for suitability on a wide range of projects. Fully assembled units are supplied with all exterior panels and diaphragms attached to the base. These units are complete stand alone gabions. Modular Gabion Systems are also supplied as separate panels which can be used to assemble the required structure with significant reduction in material costs by the elimination of common panels where gabions come together.

MODULAR GABION SYSTEMS incorporate two important features. First, diaphragms are used to divide the gabions into one meter or one yard long cells and are designed to eliminate movement of the rock fill while reinforcing the structure. Second, the wire is class III zinc galvanized or GALMAX coated. Gabion units are also supplied in stainless steel, GALMAX, or

galvanized wire coated with durable, fusion-bonded PVC (polyvinyl chloride) for use in sea works, in water polluted by sewage or chemicals or wherever abrasion is prevalent.

COMMON GABION APPLICATIONS IN THE USA AND AROUND THE WORLD ARE:

RETAINING WALLS. Gabion walls can be built with speed and economy in all circumstances and are particularly suitable for landslide control in mountainous terrain and in areas with persistently unstable conditions. Where ground is liable to subside, the ability of gabions to deform makes them preferable to a concrete wall which would crack and collapse.

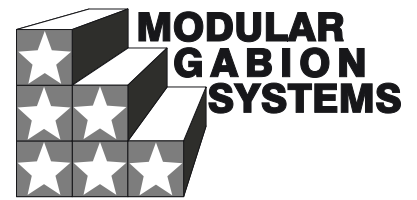
WEIRS. Gabion weirs, drop structures, and check dams are constructed across water courses as grade control structures, energy dissipaters, sediment collectors, as well as to form reservoirs, for water irrigation, and water supply in general. Gabion weirs are normally provided with a gabion mattress scour protection apron both on their downstream side and at the upstream approach zone. The weir's crest or crown is always protected with a thin layer of concrete for abrasion protection of the gabion top.

REVTMENTS. Gabions are well suited as a protective covering on slopes, river banks, channels, etc., to prevent erosion and stabilize. Gabions will withstand alternative tension and compression without losing their structural integrity and permeability.

FLEXIBLE APRONS. Gabions mattresses are commonly used to protect superstructures against the undermining action of river or sea water. Gabion mattresses will closely follow the changing contours of the bed as scouring progresses, until eventually the erosion is completely sealed off. Conventional noncompliant structures necessitate deep foundations extending well below the maximum scour level and offer protection from settlement of the river or sea bed which might otherwise ultimately lead to their partial or total collapse.

COASTAL AND BEACH PROTECTION. Gabions and gabion mattresses offer excellent protection from wave action by dissipating the energy of impact. They are superior to rip rap because the highly corrosion resistant wire mesh prevents rock displacement while allowing conformation to changing grade.

MECHANICALLY STABILIZED EARTH WALLS. Modular Gabion Systems used in conjunction with the Anchor Mesh technology allows rapid construction of large gabion faced MSE walls. The Anchor Mesh Systems extends the Modular Gabion Systems top and bottom panels into the back fill to form a continuous load bearing plane from the outer gabion surface deep into the wall for super stability, strength and durability.



WELDED STEEL WIRE MESH GABION SPECIFICATIONS

GALVANIZED GABIONS

MATERIAL. a. General: Gabions shall be made of pregalvanized welded steel wire mesh of a nominal size of 3" x 3" (7.5 cm x 7.5 cm). b. Dimensions: Gabions shall be supplied in various lengths and heights. Dimensions for heights, lengths, and widths are subject to a tolerance of ± 5% of manufacturer's stated sizes.

FABRICATION. Gabions shall be fabricated in such a manner that the base, sides, lids, ends, and diaphragms can be assembled at the construction site into a rectangular unit of the specified size. Where the length of the gabion exceeds its width, the gabion shall be divided by diaphragms into cells of equal length.

The wire mesh shall be made of galvanized steel wire having a diameter of 0.120" (3.0 mm) or 0.106" (2.7 mm). According to ASTM A-974-97, all wire used in the fabrication of the gabion and in the wiring operations shall conform to US federal specifications QQ-W-461H and possess a soft tensile strength with a class 3 finish 5 zinc coating in accordance with ASTM A-641. Preformed steel wire spiral binders with a 3" pitch are used to assemble and interconnect empty gabions and shall meet the same specifications as the wire used in the mesh.

After assembly, the individual gabion units are interconnected to each other as per manufacturer's instructions and then filled with clean, hard stone from 4" - 8" in diameter. The lids are then closed and joined to the top edges of the individual gabions and diaphragms. Ring fasteners and twist ties may be used in lieu of lacing wire for forming individual baskets and joining empty baskets together. A twist tie shall be provided at intervals of about 6". The connection shall be accomplished by turning the twist tie through 1-1/2 turns. Ring fasteners, twist ties and lacing wire can be used in lieu of spiral binders.

PVC COATED GABIONS

The same specifications for galvanized gabions apply with the additional polyvinyl chloride (PVC) coating which will be fuse bonded onto the welded mesh as follows:

- Mesh Wirecore only0.106" (2.7 mm)
- Spiral Binders.....core only0.106" (2.7 mm)
- Lacing Wire & Twist Ties.....core only0.087" (2.2 mm)
- PVC Coating Thickness0.015" (0.4 mm) minimum per side
.....0.0216" (0.55 mm) nominal per side

RESISTANCE OF THE COATING. The protective coating must be resistant to the destructive effects of immersion in acidic, salt, or polluted water, exposure to ultraviolet light and abrasion and shall retain these characteristics after a period of not less than 3,000 hours under tests in accordance with ASTM G-23.

WELDED STEEL WIRE MESH GABION MATTRESS SPECIFICATIONS

GALVANIZED GABION MATTRESS

MATERIAL. a. General: Gabion mattresses shall be made of welded steel wire mesh of a nominal size of 1-1/2" x 3" (3.8 cm x 7.5 cm). b. Dimensions: Gabion mattress units shall be supplied in various lengths. The thickness shall be 6", 9", 12" or 18". The horizontal width shall be 6'. All dimensions are subject to a tolerance of ± 5% of manufacturer's stated sizes.

FABRICATION. Gabion mattress units shall be fabricated in such a manner that the base, sides, lids, ends, and diaphragms can be assembled at the construction site into a rectangular unit of the specified size. The mattress unit length shall be subdivided into 3' compartments by the insertion of diaphragms made of the same mesh as the rest of the mattress.

The wire incorporated in the mesh constituting the body of the mattress shall be made of galvanized steel wire having a diameter of 0.087" (2.2 mm). Preformed steel wire spiral binders with a 3" pitch are used to assemble and interconnect empty gabion mattresses and shall meet the same specifications as the wire used in the mesh. All wire used in the fabrication of gabion mattresses and in the wiring operations shall conform to ASTM A-974-97 and US federal specifications QQ-W-461H and possess a soft tensile strength with a class 3 finish 5 zinc coating in accordance with ASTM A-641.

After assembly, the individual mattress units are interconnected to each other as per manufacturer's instructions and then filled with clean, hard stone from 3" - 6" in diameter. The lids are then placed and spiraled to the top edges of the individual gabion mattresses and diaphragms. Ring fasteners, twist ties and lacing wire can be used in lieu of spiral binders.

PVC COATED GABION MATTRESSES

The same specifications as for galvanized gabion mattresses apply with the additional polyvinyl chloride (PVC) coating which will be fuse bonded onto the welded mesh as follows:

- Mesh Wirecore only0.087" (2.2 mm)
- Spiral Binderscore only0.106" (2.7 mm)
- Lacing Wire & Twist Ties....core only0.087" (2.2 mm)
- PVC Coating Thickness0.015" (0.4 mm) minimum per side
.....0.0216" (0.55 mm) nominal per side

RESISTANCE OF THE COATING. The protective coating must be resistant to the destructive effects of immersion in acidic, salt, or polluted water, exposure to ultraviolet light and abrasion and shall retain these characteristics after a period of not less than 3,000 hours under tests in accordance with ASTM G-23.

Welded Steel Wire Mesh Gabions & Gabion Mattresses

Conforming to ASTM A974-97

US Federal Specification QQ-W-461H Class 3, ASTM A-641, ASTM A-90, ASTM A-185

Gabions

<u>Galvanized</u>	<u>PVC Coated</u>
3" X 3" (7.5 X 7.5 cm).....	Mesh Opening3" X 3" (7.5 X 7.5 cm)
0.106" - US Gauge 12 (2.7 mm).....	Mesh Wire0.106" - US Gauge 12 (2.7 mm).....
0.120" - US Gauge 11 (3.0 mm).....	Mesh Wire0.120" - US Gauge 11 (3.0 mm).....
0.087" - US Gauge 13.5 (2.2 mm).....	Lacing Wire0.087" - US Gauge 13.5 (2.2 mm).....
0.106" - US Gauge 12 (2.7 mm).....	Spiral Binders0.106" - US Gauge 12 (2.7 mm).....
ASTM A-90	Zinc Coating.....ASTM A-90

Minimum PVC Coating Thickness 0.015" Per Side

Letter Code	Length	Width	Height	No. of Cells	Capacity Cu. Yds.
A	6'	3'	3'	2	2.00
B	9'	3'	3'	3	3.00
C	12'	3'	3'	4	4.00
D	6'	3'	1.5'	2	1.00
E	9'	3'	1.5'	3	1.50
F	12'	3'	1.5'	4	2.00
G	6'	3'	1'	2	0.66
H	9'	3'	1'	3	1.00
I	12'	3'	1'	4	1.33



Gabions also available in metric sizes. All gabion sizes available in double widths or combination widths.

Gabion Mattresses

<u>Galvanized</u>	<u>PVC Coated</u>
1.5" X 3" (3.8 X 7.5 cm).....	Mesh Opening1.5" X 3" (3.8 X 7.5 cm)
0.087" - US Gauge 13.5 (2.2 mm)	Mesh Wire0.087" - US Gauge 13.5 (2.2 mm)
0.087" - US Gauge 13.5 (2.2 mm).....	Lacing Wire0.087" - US Gauge 13.5 (2.2 mm)
0.106" - US Gauge 12 (2.7 mm).....	Spiral Binders0.106" - US Gauge 12 (2.7 mm).....
ASTM A-90	Zinc Coating.....ASTM A-90

Minimum PVC Coating Thickness 0.015" per Side
Nominal PVC Coating Thickness 0.0216" per Side

Letter Code	Length	Width	Height	No. of Cells	Capacity Cu. Yds.
Q	9'	6'	6"	3	1.00
R	12'	6'	6"	4	1.33
T	9'	6'	9"	3	1.50
U	12'	6'	9"	4	2.00
VV	9'	6'	12"	4	2.00
W	12'	6'	12"	4	2.66



Gabion Mattresses also available in metric sizes.

Modular Gabion Systems

Erosion & Flood Control Specialists

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PO Box 9445, Houston, TX 77261-9445

800.324.8282 • 713.924.4371 • 713.924.4381 fax

Alabama Engineering Office: 251.380.0332 • 251.380.0746 fax

A Division of C. E. Shepherd Company

Typical Cross Section of Modular Gabion Wire



Revised 2/02