HILFIKER
RETAINING WALLS

ArtWeld Gabion Standard Submittal Documents

For: 9 Gauge
Class III
Galvanized 3”x3”
Welded Wire
Mesh
100% Domestic

Click to jump to section

- Sample Certification
- Product Specification
- Standard Drawing
- Construction Guide
- Product Warranty

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MODULAR GABION SYSTEMS

A Division Of The C. E. Shepherd Manufacturing Group

Corporate Offices
2221 Canada Dry Street
Houston TX 77023
800.324.8282
713.924.4371
713.924.4381 fax

Engineering Offices
Mobile, Alabama
251.422.3536
251.343.5005 fax

Customer: **HILFIKER PIPE COMPANY, INC.**
W/O#20092601 P.O. #14117

GABION WIRE SPECIFICATIONS

WIRE MESH FINISHED ROLL PHYSICAL PROPERTIES

MESH DIMENSIONAL	3" X 3"
FINISH	GBW

DIMENSIONAL SPECIFICATONS (COMFORMANCE TO ASTM F-2453)

MESH SQUARENESS	1/4"
WIRE DIAMETER	9 GA. (0.1483" ± 0.004")
INDIVIDUAL SPACING	ALL SPACING ± 0.125"
FLATNESS	± 2"

WIRE MECHANICAL PROPERTIES (ASTM A185; A856-03)

SPIRAL FASTENER	0.1055"± 0.004"	TENSILE STRENGTH 65,000 PSI
WIRE COATING	GALVANIZED CLASS III SOFT 0.80 OZ/FT^2	
MIN. TENSILE STRENGTH FOR GALVANIZED SINGLE STRANDS CLASS III		60,000 PSI
MIN. GALVANIZED SINGLE STRANDS CLASS III BREAKING STRENGTH		1,081 LBS
MIN. WELD SHEAR STRENGTH		450 LBS

PVC WIRE & SPIRAL COATING PROPERTIES	TEST METHOD	VALUE
COATING THICKNESS	ASTM A-90	0.023" – 0.029" ± 0.002"
BRITTLENESS TEMPERATURE	ASTM D-746	NOT HIGHER THAN 15 °F
TENSILE STRENGTH	ASTM D-638	2275 PSI MINIMUM
MODULUS OF ELASTICITY	ASTM D-638	1980 PSI @ 100 STRAIN
HARDNESS	ASTM D-2240	86 SHORE A MINIMUM
FLEXIBILITY	ASTM D-522	1/8" @ 360 BEND @ -0 °F
SALT SPRAY RESISTANCE	ASTM B-117	3000 HOURS
UV EXPOSURE	ASTM D-1499 & G 23	3000 HOURS

Materials are Made in USA and comply with the Buy America Act.

QA MANAGER Randy Brewer DATE July 18, 2024

ORIGINAL

IECA MEMBER

Southwestern Wire, Inc.

MADE IN U.S.A. NORMAN, OK

Date: 06/19/2024

Customer: C.E. Shepherd

Address: 2350 Eleanor Tinsley Way
Houston, 77023

RE: ASTM A 641/A 641M-98 Standard Specification for Zinc Coating (Galvanized) Carbon Steel

To Whom It May Concern:

This is to certify that all materials shipped on PO# 77772105 (Order# 148345-Invoice# 179165) Consisting of .113 Class I and .146 Class III (with chromate) Galvanized Wire complies in all respects with the specification outlined in the above designation.

All materials listed above are produced and manufactured in the United States.

Darren Newson
Quality Assurance

SWORN AND
SUBSCRIBED TO
BEFORE ME THIS DAY

6.19.24

Notary Public

Paris Barnes

My commission Expires

6.18.25

All material listed above
produced and manufactured
in the United States.

PARIS BARNES
NOTARY
21008147
EXP. 06/18/25
PUBLIC
STATE OF OKLAHOMA

MATERIAL TEST REPORT

Date Printed: 03/14/2024

Mid American Steel & Wire
Madill, Oklahoma

Bill to:
SOUTHWESTERN WIRE
3505 N, INTERSTATE 35 P O B
KBOLLINGER@SOUTHWESTE
NORMAN, OK 73070

Ship to:
SOUTHWESTERN WIRE
3505 N INTERSTATE 35
P.O. BOX CC
NORMAN, OK 73069

Customer No: 000000000006
PO Number: SWW-24-67135
Ship Date: 03/14/2024
Order Number: 00147592
Load Number: 431998

Item Number	Description
D00141006B0M	1006B - 1/4 In Rod

CHEMICAL ANALYSIS

Heat Number	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	V	Al	N	B
2421111	0.05	0.38	0.009	0.024	0.18	0.23	0.09	0.07	0.019	0.009	0.001	0.002	0.0094	0.0065

MECHANICAL PROPERTIES

Heat Number	Yield (Psi)	Tensile (Psi)	Elongation (%)	Reduction (%)	Bend Test Pass/ Fail
2421111	38686 psi / 00267	55010 psi /	25	80.0466666	

The melting and rolling processes used to manufacture the above described material took place in the United States of America. The material was produced and tested in accordance with ASTM A-510.

14th Day of March, 2024

MATERIAL TEST REPORT

Date Printed: 01/18/2024

Mid American Steel & Wire
Madill, Oklahoma

Bill to:
SOUTHWESTERN WIRE
3505 N, INTERSTATE 35 P O B
KBOLLINGER@SOUTHWESTE
NORMAN, OK 73070

Ship to:
SOUTHWESTERN WIRE
3505 N INTERSTATE 35
P.O. BOX CC
NORMAN, OK 73069

Customer No: 000000000006
PO Number: SWW-24-66537
Ship Date: 01/18/2024
Order Number: 00146424
Load Number: 430846

Item Number	Description
D07321006B0M	1006B - 7/32 In Rod

CHEMICAL ANALYSIS

Heat Number	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Sn	V	Al	N	B
2325479	0.06	0.41	0.011	0.026	0.17	0.24	0.08	0.07	0.019	0.008	0.001	0.002	0.0086	0.006

MECHANICAL PROPERTIES

Heat Number	Yield (Psi)	Tensile (Psi)	Elongation (%)	Reduction (%)	Bend Test Pass/ Fail
2325479	41801 psi / 00398	57706	21.88	77.4433333	

The melting and rolling processes used to manufacture the above described material took place in the United States of America. The material was produced and tested in accordance with ASTM A-510.

18th Day of January, 2024

ArtWeld Gabion
Product Specification
(Galvanized, 9 Gauge Wire)

1.0 DESCRIPTION

This work shall consist of Hilfiker ArtWeld Gabions (welded wire mesh) and filling the gabions with rock in accordance with the details shown on project plans and special provisions.

2.0 MATERIALS

Gabions shall be of a single unit construction. The base, ends, sides, and lid shall be either welded into a single unit or shall be connected in such a manner that strength and flexibility at the connection are at least equal to that of the wire mesh. The gabions shall be fabricated in such a manner that they can be assembled at the construction site with Spiral Binders and pre-formed stiffeners into rectangular baskets of the specified size.

The height, length, and width of the gabions shall not vary more than 5 percent from the dimensions shown on the plans.

Gabions shall be divided into cells of equal length, not more than 3 feet long, by diaphragms made of the same wire mesh as used for the gabion body. Each gabion shall be fabricated with the necessary diaphragm or diaphragms secured in proper position on the base in such a manner that no additional tying at the base will be necessary.

Wire for the manufacture and assembly of gabions shall ***meet or exceed*** any combination of the following requirements:

Description	**Requirement**
3"x3" (7.62 cm x 7.62 cm), 9 Ga. - 0.144 in. min. (3.66 mm) Welded Wire Fabric	ASTM A1064, A370
Exception: Weld Shear at 800 lbs of force min.	
Galvanization: (9 Ga. 0.90 oz/SF)	ASTM A641, A90
9 Ga. Galvanized Pre-Formed Stiffener	N/A
9 Ga. Galvanized Spiral Binder - min. 0.144 in. (3.66 mm)	ASTM A641, A90
13.5 Ga. Tie Wire - min. 0.086 in. (2.2 mm) Galvanized 0.70 oz/SF	ASTM A641, A90

3.0 ROCK

Rock for filling the gabions shall be as listed:

100% passing 8 inches (20.3 cm), 0-5% passing 4 inches (10.2 cm)

4.0 CONSTRUCTION

Gabions shall first be assembled individually as empty units. Each gabion shall be manufactured with the necessary panels, properly spaced and secured, so they can be rotated into position at the construction site with no additional tying of the rotation joint. The panels and diaphragms shall be rotated into position and joined along vertical edges.

When 13.5-gauge tie wire is used as the joint material, all vertical edges of each gabion panel shall first be constructed to form individual empty gabions. Simple spiraling (looping without locking) of 13.5-gauge tie wire is not permitted. For welded-mesh, the joint shall be constructed using alternating single and double half hitches (locked loops) in every mesh opening along the joint.

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phone: **707.443.5093** toll free: **800.762.8962** fax: **707.443.2891**

When 9-gauge spiral binders are used, the spiral shall be screwed into position such that it passes through each mesh opening along the joint. Both ends of all 9-gauge spiral binders shall be crimped to secure the spiral in place.

Temporary fasteners may be used to hold panels wherever gabion-to-gabion joints will be constructed. Temporary fasteners may remain in place.

4.1 Assembly of Successive Gabions (Gabion-to-Gabion Joints)

Empty gabions shall be set in place. Individually constructed empty gabions shall be joined successively to the next empty gabion with 13.5-gauge tie wire or 9-gauge spirals, before filling with rock begins. The 13.5-gauge tie wire or 9-gauge spiral binders shall secure, in one pass, all selvage or end wires of panels of all the adjacent gabions along the joint.

4.2 Assembly of Multiple Layered Gabions

Multi-layered gabion configurations can be stepped and staggered as shown on the plans or as directed by the Engineer. When constructing multi-layered gabion configurations, each layer of gabions can be joined to the underlying layer along the front and ends, or as shown on the plans.

4.3 Assembly of Single-Layered Gabions

Single-layered gabion configurations shall be butted and joined along the front, back, and ends as shown on the plans, including tops and bottoms of adjacent gabions.

4.4 Assembly of Shear Key Gabions

Shear key gabions (also called "counterforts") shall be spaced as shown on the plans. Shear key gabions shall be tied to adjacent gabions in the manner specified for "Assembly of Successive Gabions."

4.5 Modified Geometry

To match the geometry of the planned gabion configuration, or to meet specific conditions panels shall be folded, cut, and/or re-tied to dimensions shown on the plans or as approved by the Engineer.

4.6 Filling with Rock

Rock shall be placed in gabions to insure proper alignment, avoid bulges, and provide a minimum of voids. All exposed rock surfaces shall have a smooth and neat appearance. No sharp edges shall project through the wire mesh.

When constructing with 1.5-foot high or 3-foot high gabions, pre-formed stiffeners shall be used to produce a flat, smooth external surface.

Pre-formed Stiffeners shall be installed on the exposed face of the gabion prior to rock placement, two rows at 1/3 points on 3' high gabions, one row at 1/2 point in 1.5' high gabions.

When filling 3-foot high gabions, rock shall be placed in 3 nominal 12-inch layers; when filling 1.5-foot high gabions, rock shall be placed in two 9-inch layers.

The last layer of rock shall slightly overfill the gabions such that the lid will rest on rock when it is closed.

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4.7 Closure of Lids

Lids shall be tied along the front, ends, and diaphragms of individual gabions and to successive gabions with 9-gauge spiral binders in the same manner as specified elsewhere in this specification.

5.0 MEASUREMENT

Quantities of gabions to be paid for will be measured by the cubic yard and will be determined from the dimensions shown on the plans or the dimensions directed by the Engineer.

• End of Section •

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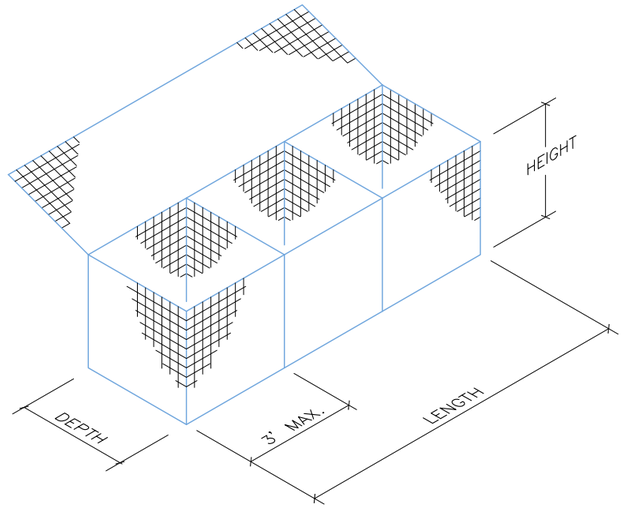
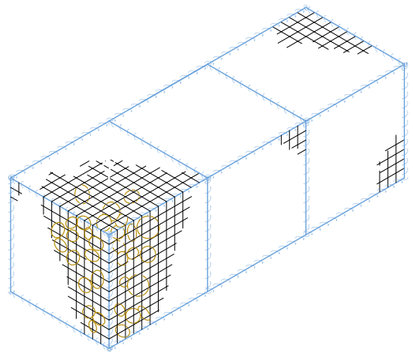
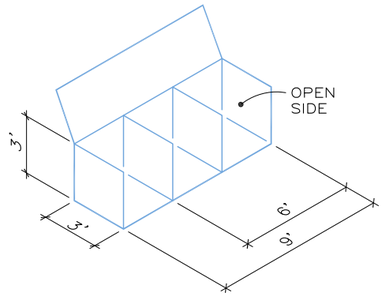


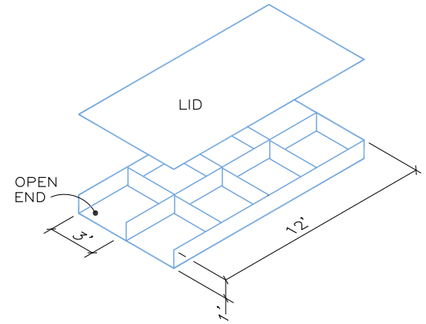
TYPICAL GABION
NOT TO SCALE



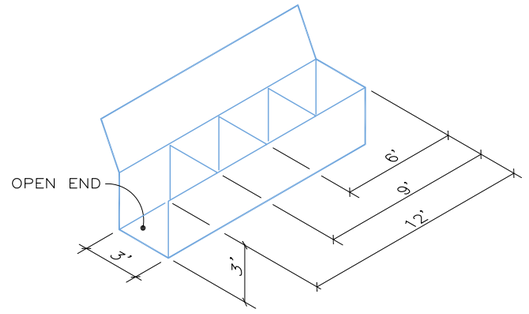
TYPICAL ASSEMBLED GABION
NOT TO SCALE



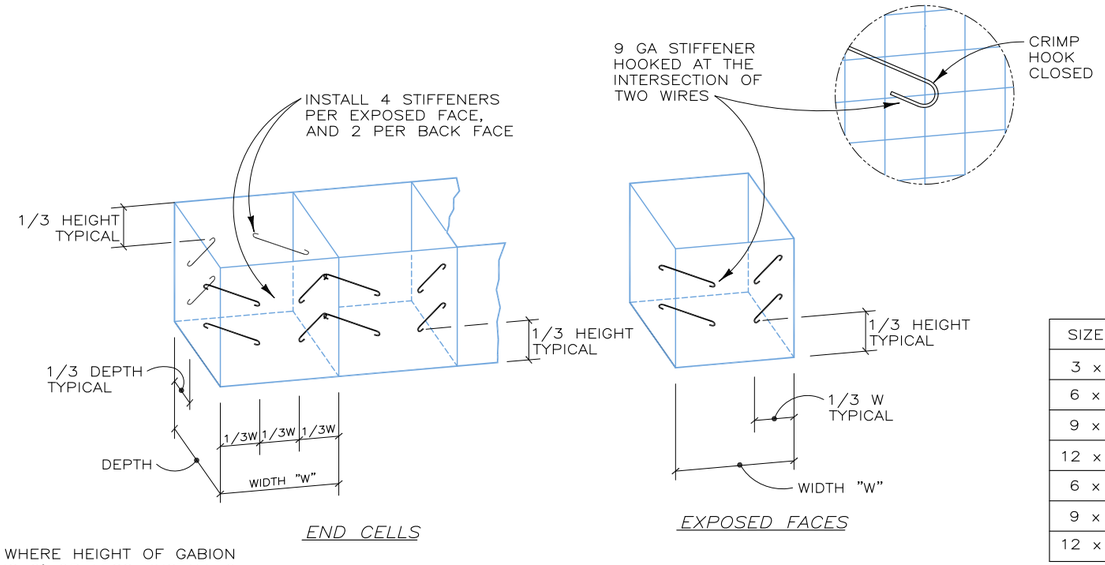
NOTE: SIZES CAN VARY
TYPICAL OPEN SIDE
NOT TO SCALE



NOTE: SIZES CAN VARY
TYPICAL MATTRESS
NOT TO SCALE



NOTE: SIZES CAN VARY
TYPICAL OPEN END
NOT TO SCALE



WHERE HEIGHT OF GABION IS 2' OR LESS, INSTALL 2 STIFFENERS PER FACE
WHERE HEIGHT IS 12", NO STIFFENERS REQUIRED

STIFFENER DETAILS
NOT TO SCALE

STANDARD GABION SIZES

SIZE LxWxH	CU.YD.	SIZE LxWxH	CU.YD.	SIZE LxWxH	CU.YD.
3 x 3 x 3	1	3 x 3 x 1.5	0.5	3 x 3 x 1	0.33
6 x 3 x 3	2	6 x 3 x 1.5	1	6 x 3 x 1	0.67
9 x 3 x 3	3	9 x 3 x 1.5	1.5	9 x 3 x 1	1
12 x 3 x 3	4	12 x 3 x 1.5	2	12 x 3 x 1	1.33
6 x 6 x 3	4	6 x 6 x 1.5	2	6 x 6 x 1	1.33
9 x 6 x 3	6	9 x 6 x 1.5	3	9 x 6 x 1	2
12 x 6 x 3	8	12 x 6 x 1.5	4	12 x 6 x 1	2.67

NOTES

1. GABION SIZES ARE EXPRESSED IN FEET.
2. MATTRESSES AND CUSTOM SIZES PROVIDED ON REQUEST.
3. GABIONS WHICH ARE TO BE CONNECTED TOGETHER SIDE–TO–SIDE OR END–TO–END, MAY BE PROVIDED OPEN–SIDED OR OPEN–ENDED AS SHOWN TO REDUCE WEIGHT, COST, AND ASSEMBLY TIME.
4. GABIONS ARE MANUFACTURED OF 3"x3" WELDED WIRE MESH, 9 GA. WITH 0.9 OZ/SF ZINC COATING, OR 11 GA. WITH 0.85 OZ/SF ZINC COATING. OPTIONAL 2.0 OZ/SF ZINC COATING IS AVAILABLE ON REQUEST.

COLOR COMPILED GABION DETAILS

REV.NO.	DATE	BY	DESCRIPTION
1	6/16/98	DR	REVISED ZINC COATING THICKNESS
2	4/12/02	DR	UPDATED BORDER
3	12 SEP 07	AMJ	UPDATED BORDER, MINOR CHANGES
4	29 OCT 13	AMJ	ADDED COLOR TO DETAILS

GRAPHIC SCALE
LINE IS 20 UNITS LONG ON ORIGINAL DRAWING
0 10 20

PROJ.MGR.
ENGINEER
CADD BY HRW

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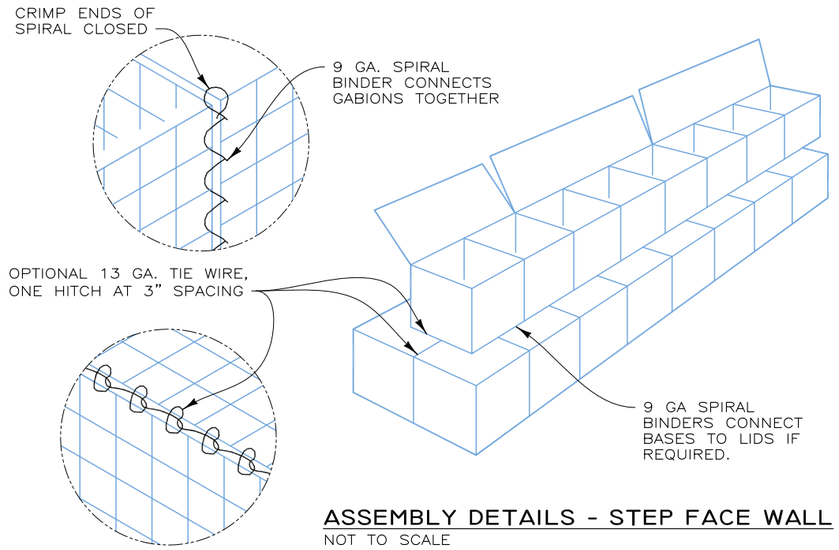
DWG DATE 17 JUL 95
REVISION DATE 29 OCT 13
SCALE NOTED

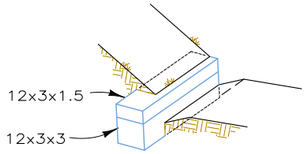
STANDARD DRAWING
ARTWELD GABIONS
DETAILS AND NOTES

PROJECT NO.
SHEET 1 OF 4



ASSEMBLY DETAILS - STEP FACE WALL

NOT TO SCALE



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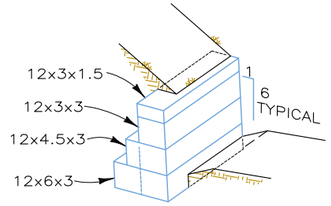

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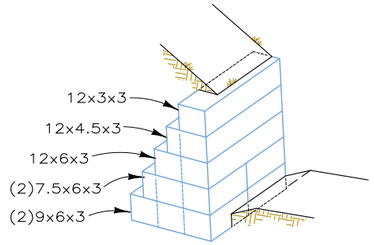

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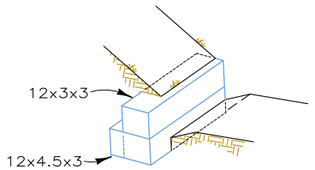

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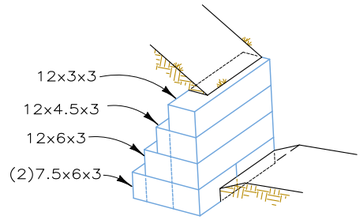

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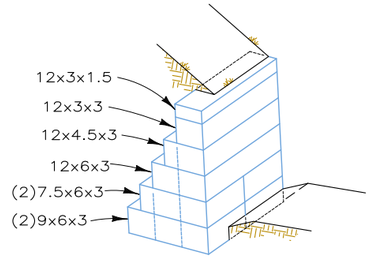

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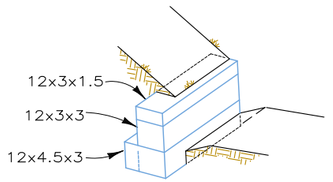

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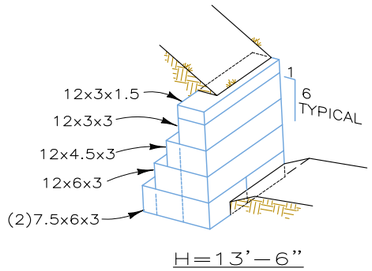

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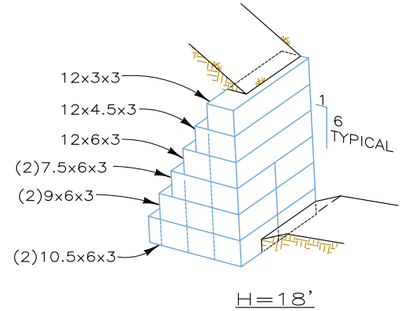

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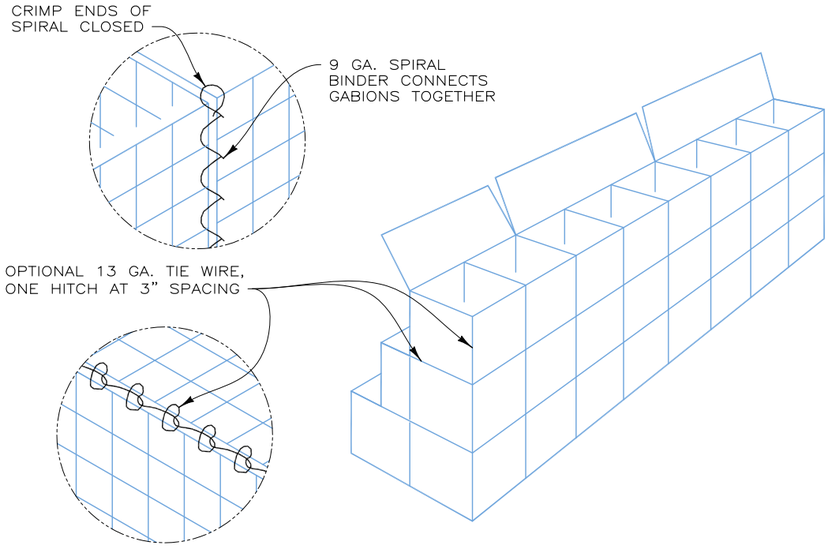
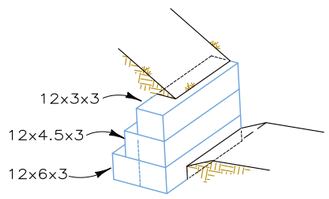


ASSEMBLY DETAILS - VERTICAL WALL

NOT TO SCALE



H=9'

GABION CONFIGURATION NOTES

1. THESE DRAWINGS ARE CONCEPTUAL, AND FOR BIDDING PURPOSES ONLY.

2. LENGTH OF GABIONS MAY BE VARIED, AND GABIONS MAY BE STAGGERED IF DESIRED. STANDARD GABIONS ARE SHOWN IN THIS CONCEPTUAL DRAWING FOR SIMPLICITY.

3. ALL GABIONS TO BE 3"x3", 9 GA WWF.

4. FLAT 9 GA END PANELS WILL BE SUPPLIED TO CLOSE OFF OPEN ENDS OF LIFTS.

COLOR COMPILED GABION DETAILS

REV.NO.	DATE	BY	DESCRIPTION
1	6/16/98	DR	REVISED ZINC COATING THICKNESS
2	4/12/02	DR	UPDATED BORDER
3	12 SEP 07	AMJ	UPDATED BORDER, MINOR CHANGES
4	29 OCT 13	AMJ	ADDED COLOR TO DETAILS

GRAPHIC SCALE

LINE IS 20 UNITS LONG ON ORIGINAL DRAWING

0 10 20

PROJ.MGR.

ENGINEER

CADD BY HRW

HILFIKER RETAINING WALLS

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SINCE 1902 QUALITY PRODUCTS

DWG DATE 17 JUL 95

REVISION DATE 29 OCT 13

SCALE NOTED

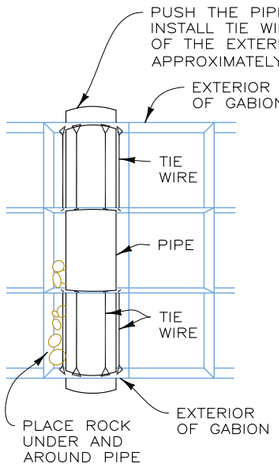
STANDARD DRAWING

ARTWELD GABIONS

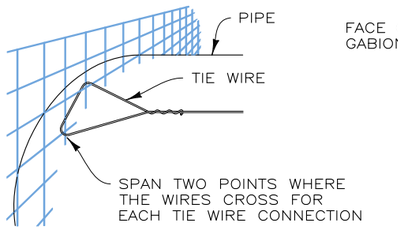
DETAILS AND NOTES

PROJECT NO.

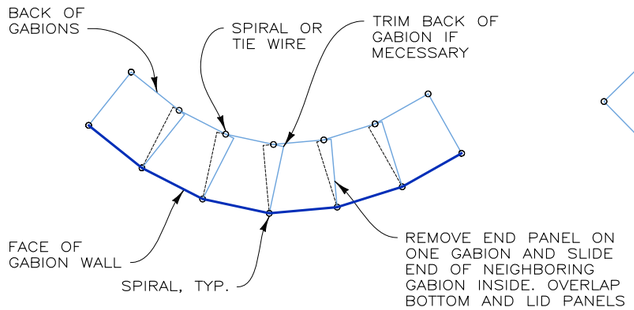
SHEET 2 OF 4



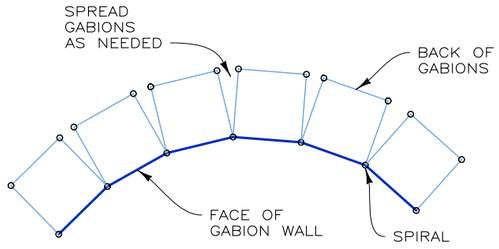
PIPE THRU GABION DETAIL
NOT TO SCALE



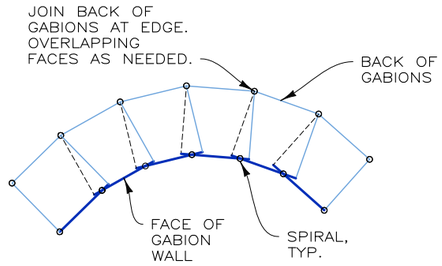
TIE WIRE DETAIL



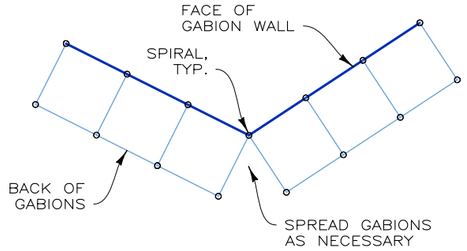
PLAN VIEW
CONVEX CURVE
NOT TO SCALE



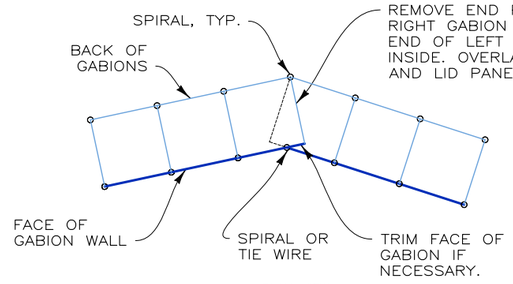
PLAN VIEW
CONCAVE CURVE
GAPPED BACK



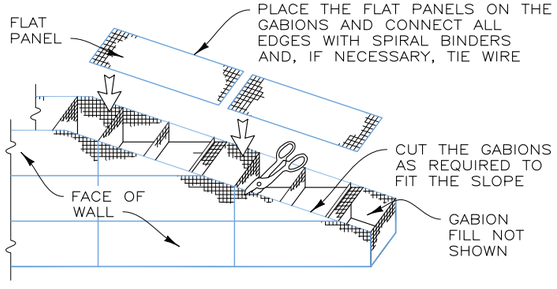
PLAN VIEW
CONCAVE CURVE
JOINED BACK



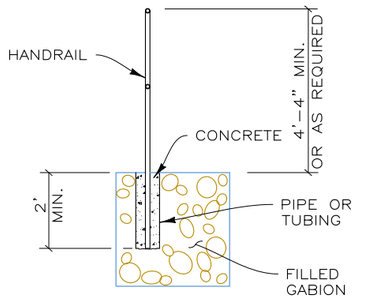
PLAN VIEW
CONCAVE ANGLE
GAPPED BACK



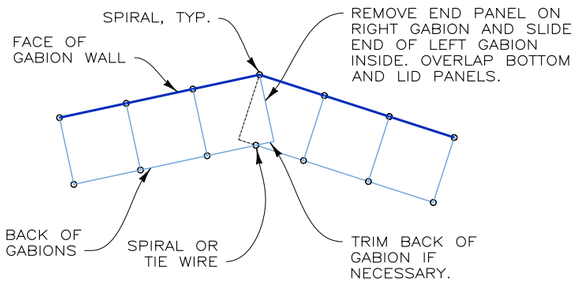
PLAN VIEW
CONCAVE ANGLE
NOT TO SCALE



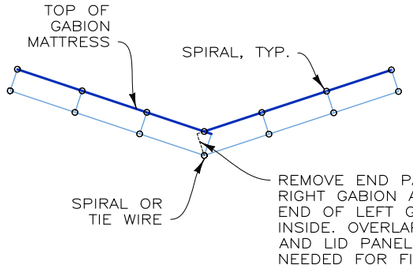
PICTORIAL ELEVATION
SLOPED GABION DETAIL
NOT TO SCALE



HANDRAIL ANCHORED IN GABION
NOT TO SCALE



PLAN VIEW
CONVEX ANGLE
NOT TO SCALE



V-DITCH SECTION
NOT TO SCALE

COLOR COMPILED GABION DETAILS

REV.NO.	DATE	BY	DESCRIPTION
1	6/16/98	DR	REVISED ZINC COATING THICKNESS
2	4/12/02	DR	UPDATED BORDER
3	12 SEP 07	AMJ	UPDATED BORDER, MINOR CHANGES
4	29 OCT 13	AMJ	ADDED COLOR TO DETAILS

GRAPHIC SCALE
LINE IS 20 UNITS LONG ON ORIGINAL DRAWING
0 10 20

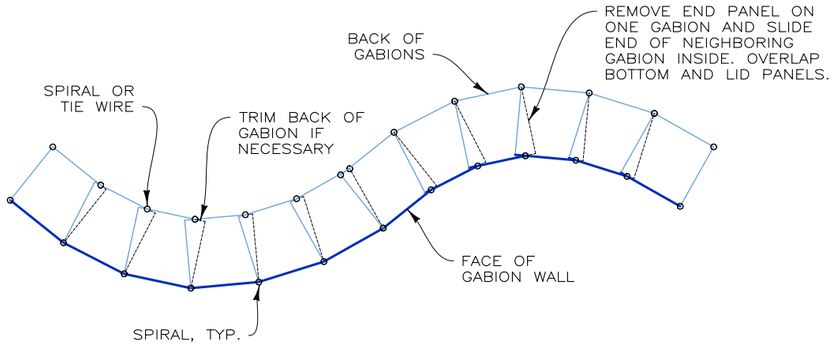
PROJ.MGR.
ENGINEER
CADD BY HRW

HILFIKER RETAINING WALLS
1902 Hilfiker Lane
Eureka, CA 95503-5711
TOLL-FREE **800.762.8962**
PH **707.443.5093** FAX **707.443.2891**
WEB SITE www.hilfiker.com E-MAIL info@hilfiker.com

DWG DATE 19 SEPT 08
REVISION DATE 29 OCT 13
SCALE NOTED

STANDARD DRAWING
ARTWELD GABIONS
MISCELLANEOUS DETAILS

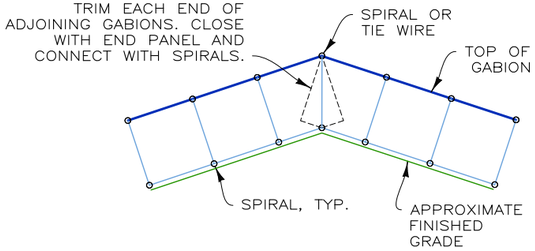
PROJECT NO.
SHEET 3 OF 4



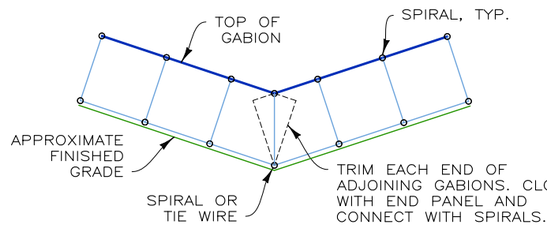
PLAN VIEW

CURVILINEAR DETAIL

NOT TO SCALE



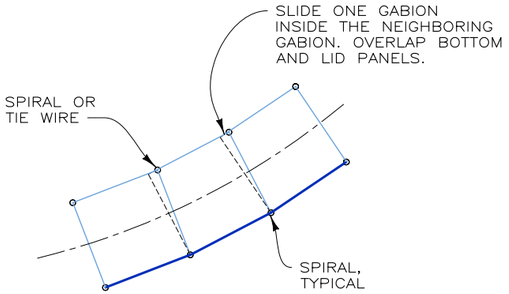
ELEVATION VIEW



ELEVATION VIEW

GABIONS ON GRADE

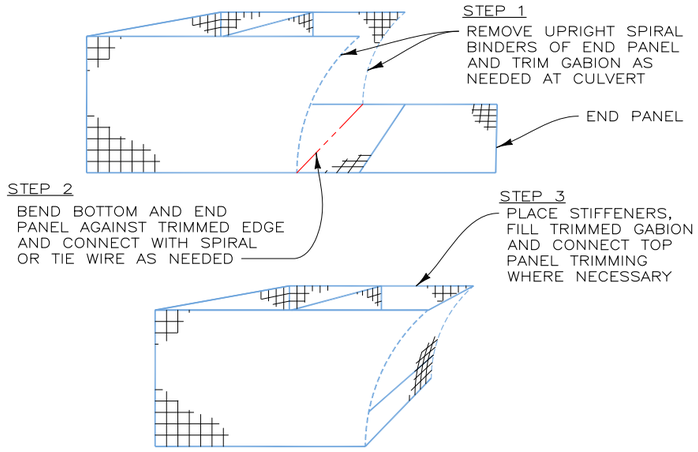
NOT TO SCALE



PLAN VIEW

FITTING GABIONS TO CURVE

SCALE: 1"=5'



PICTORIAL ELEVATION

TRIMMED GABION DETAIL

NOT TO SCALE

COLOR COMPILED GABION DETAILS

REV.NO.	DATE	BY	DESCRIPTION
1	6/16/98	DR	REVISED ZINC COATING THICKNESS
2	4/12/02	DR	UPDATED BORDER
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GRAPHIC SCALE

LINE IS 20 UNITS LONG ON ORIGINAL DRAWING

0 10 20

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SCALE NOTED

STANDARD DRAWING

ARTWELD GABIONS

MISCELLANEOUS DETAILS

PROJECT NO.

SHEET 4 OF 4

ARTWELD GABIONS

& GABION FACED M.S.E.

Construction Guide

HILFIKER RETAINING WALLS

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Eureka, California 95503-5711
Local (707)443-5093 - Toll Free (800)762-8962

Web: http://hilfiker.com email: info@hilfiker.com

SCAN TO VISIT OUR WEBSITE

The **ArtWeld Gabion** is named for our friend and coworker, Arthur Lee Hilfiker, who originated, developed and tested the gabions before his untimely death in June 1986. Arthur's idea was to develop a gabion that was easily shipped, quickly assembled and structurally superior to conventional gabions. He succeeded admirably.

The possible uses of ***ArtWeld Gabions*** *are so varied that this guide can not show them all. Th purpose of this guide is to detail only the assembly process. Follow your plans for the structural design and site placement.*

ArtWeld Gabions are factory cut from galvanized or non-galvanized 3" x 3" Welded Wire Mesh. The main panel components are fastened together at our facilities with galvanized clips and spiral binders. They are then folded and shipped flat to the site. No flattening, bending, stretching or folding is required in the field. The sides are simply raised and connected together with spiral binders. Because the wire is not bent, no cracking of the galvanized coating can occur. Typically, a 6' x 3' x 3' gabion takes less than 5 minutes to make ready for filling.

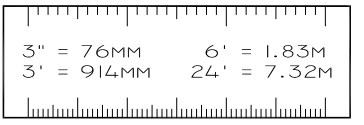
The strength of Welded Wire Mesh offers many advantages. It allows careful machine filling. It is easy to hold the alignment of the face. The manufacture of large gabions is possible, up to 24' x 6' x 3', meaning fewer seams to be joined in the field. Also, if a gabion must be cut to fit site conditions, the wire can be cut with bolt cutters without losing structural strength.

ArtWeld Gabions can be manufactured in conventional sizes, or custom sizes for special site conditions. Wire diameter and thickness of galvanizing, if any, can be varied to suit job requirements.

For your next gabion project, contact Hilfiker Retaining Walls for a quote on a product we are proud to manufacture. We look forward to being of service to you and your clients.

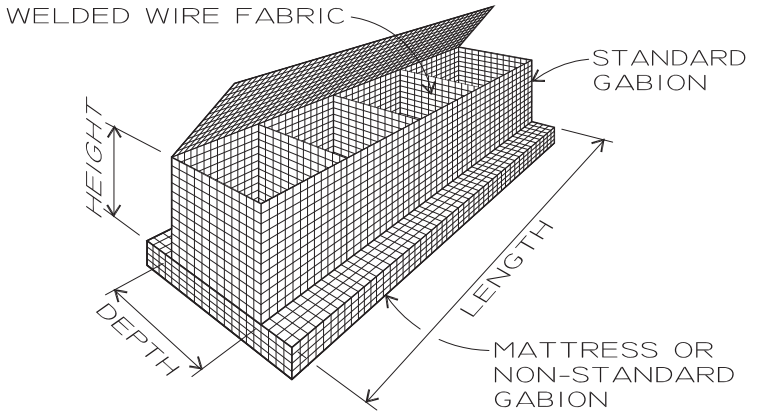
July 2014

AMERICAN OWNED & OPERATED



1902-2002 100 YEARS HILFIKER COMPANY

ARTWELD GABIONS CAN BE MANUFACTURED IN BOTH ENGLISH AND METRIC UNITS.
FOR SIMPLICITY, DIMENSIONS IN THIS GUIDE REFER ONLY TO *ENGLISH UNITS*. CONSTRUCTION METHODS FOR BOTH TYPES ARE IDENTICAL.



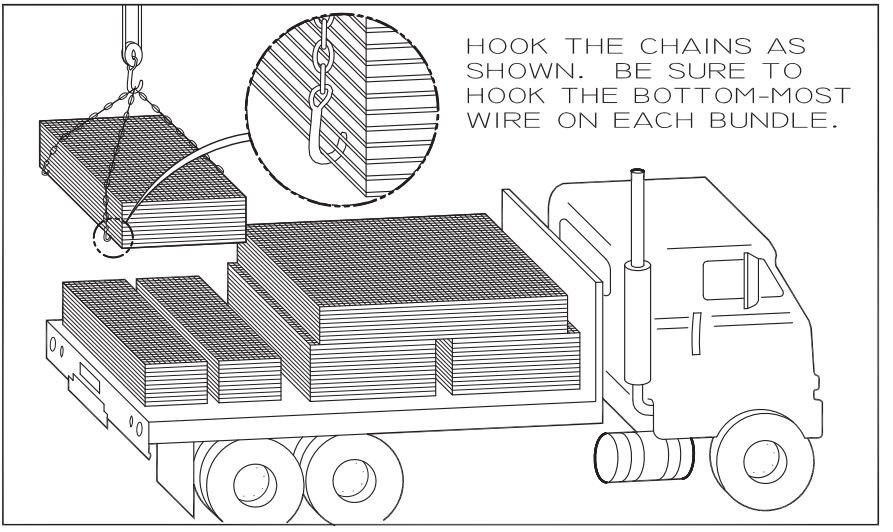
STANDARD *ENGLISH* UNIT GABIONS ARE SIZED IN MULTIPLES OF 3 FEET (0.914 METERS). THEY ARE MANUFACTURED OF 3"x3" (76MM X 76MM) WELDED WIRE FABRIC.

BOTH ENGLISH UNIT AND METRIC UNIT GABIONS ARE SUPPLIED IN 9 GA AND 11 GA GALVANIZED, AND 9 GA NON-GALVANIZED WELDED WIRE FABRIC.

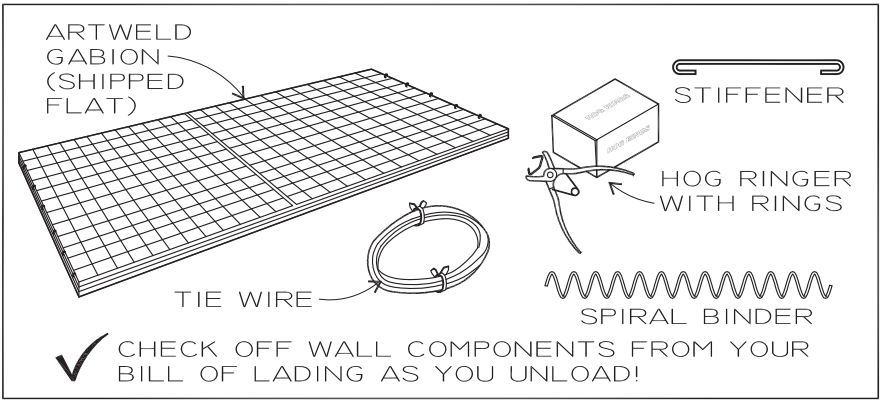
NON-STANDARD SIZES, AND MATTRESSES, CAN BE SPECIAL-ORDERED TO FIT PROJECT REQUIREMENTS.

*HILFIKER NO LONGER OFFERS METRIC SPACING. WE WILL ATTEMPT TO MATCH THE OVERAL METRIC DIMENTIONS THE BEST WE CAN WITH IMPERIAL UNITS.

RECOMMENDED UNLOADING PROCEDURE

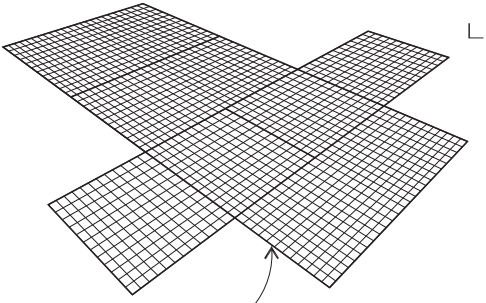


GABION PARTS (NOT TO SCALE)

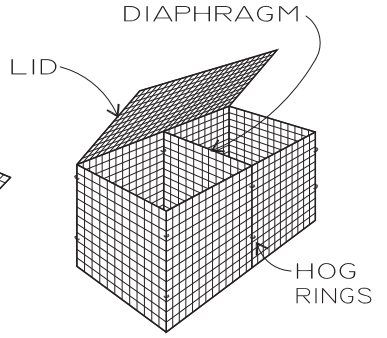


ON-SITE ASSEMBLY

1

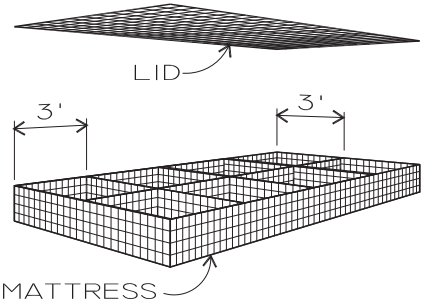


FIRST, UNFOLD THE GABION



THEN STAND THE SIDES UP AND JOIN THE EDGES TEMPORARILY WITH HOG RINGS

THIS GUIDE SHOWS ASSEMBLY WITH HOG RINGS AND SPIRAL BINDERS BECAUSE THAT IS THE EASIEST AND FASTEST ASSEMBLY METHOD.

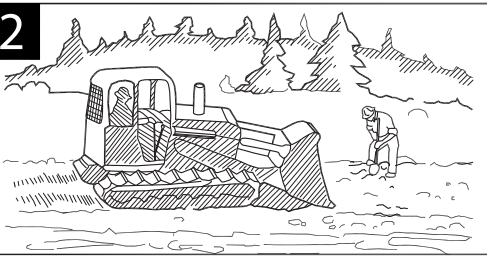


YOU MAY USE TIE WIRE AND HALF-HITCH LACING FOR ALL CONNECTIONS IF DESIDED.

HOG RINGS ARE *NOT* PERMANENT CONNECTIONS AND MUST BE FOLLOWED BY SPIRAL BINDERS OR TIE WIRE.

LIDS ARE NOT FACTORY ATTACHED ON GABIONS WIDER THAN 3'.

2



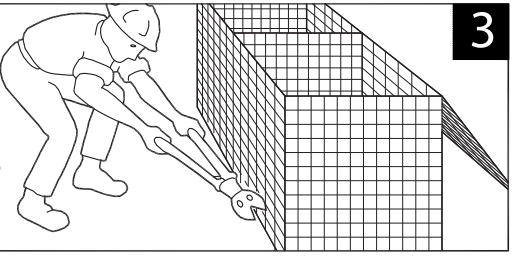
EXCAVATE AND FINE-GRADE THE FOUNDATION.

FOUNDATION MUST BE REASONABLY LEVEL AND CAPABLE OF SUPPORTING IMPOSED LOADS

3

GABIONS MAY BE FIELD CUT TO FIT CURVES, CULVERTS OR ANGLES.

RECONNECT THE ENDS OF THE GABIONS THE SAME WAY YOU WOULD ASSEMBLE AN UNCUT GABION



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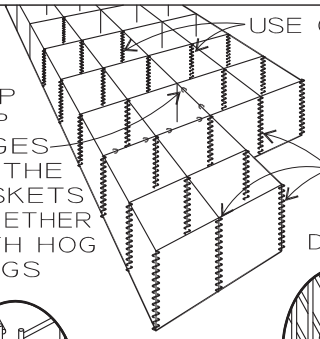
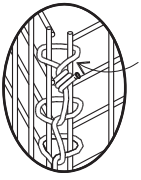


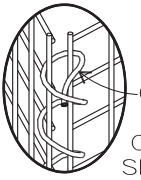
USE ONE SPIRAL AT *EVERY* VERTICAL CONNECTION.

CLIP TOP EDGES OF THE BASKETS TOGETHER WITH HOG RINGS

BIND ALL EXTERIOR CORNERS & DIAPHRAGMS



IF YOU ARE USING TIE WIRE, USE HALF-HITCH LACING AT 3"

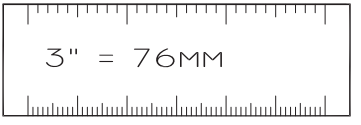


CRIMP ENDS OF ALL SPIRAL BINDERS

PLACE THE FIRST COURSE OF GABIONS ON THE FOUNDATION.

YOU MAY CLIP THE SIDES TOGETHER WITH HOG RINGS TO HOLD THEM TEMPORARILY.

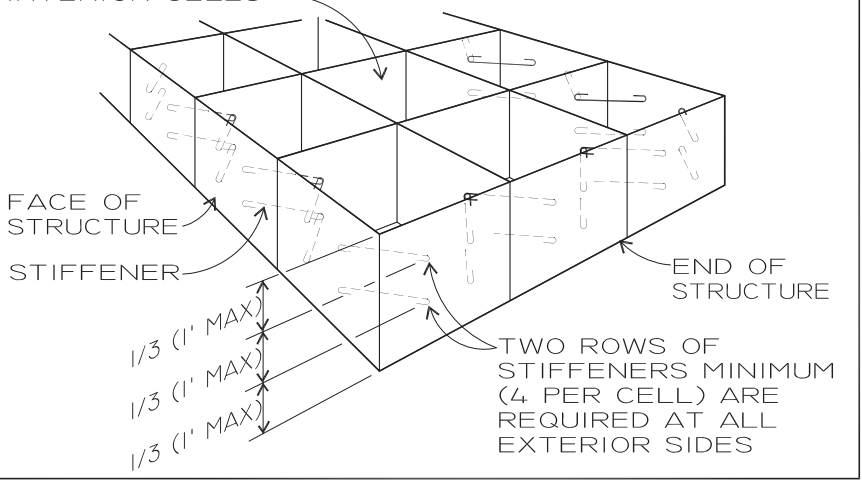
PERMANENTLY BIND THE GABIONS TOGETHER AS SHOWN FOR THE FULL HEIGHT AT ALL CORNERS AND DIAPHRAGMS.



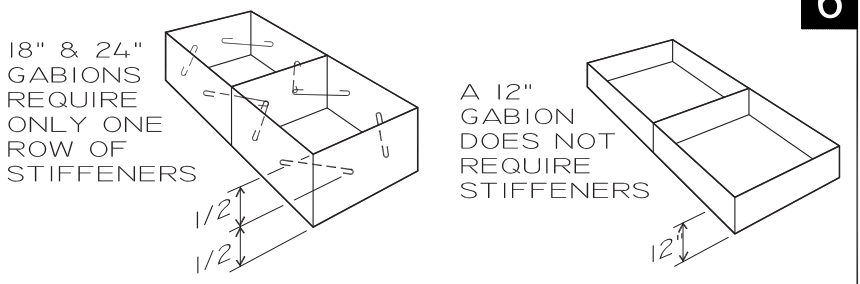
STIFFENER INSTALLATION

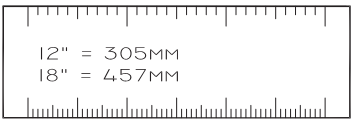
5

BEFORE FILLING, INSTALL STIFFENERS ACROSS THE CORNERS OF THE GABIONS ON ALL EXTERIOR SIDES OF THE STRUCTURE



6





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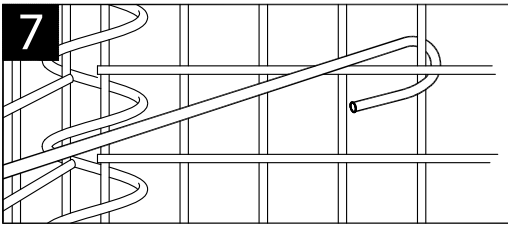


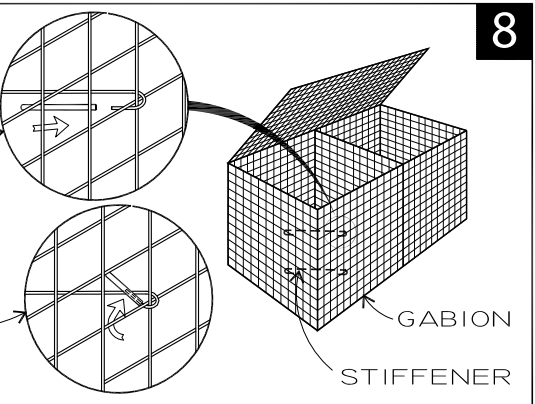
BE SURE TO HOOK THE STIFFENERS ACROSS A WELD INTERSECTION AS SHOWN.

CRIMP BOTH ENDS OF THE STIFFENERS CLOSED.

8

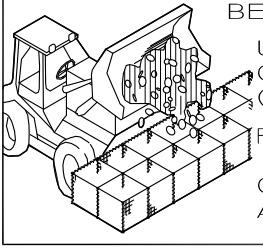
CLOSE THE END OF THE HOOK ON THE STIFFENER

TWIST THE END OF THE STIFF-ENER AND SECURE IT FOR THE BACKFILL OPERATION



BEGIN THE FILL

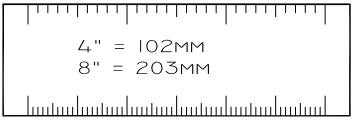
9



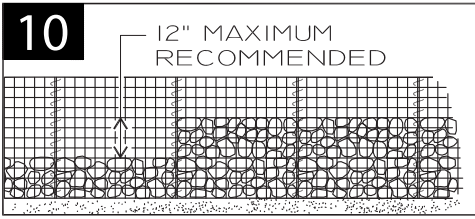
CHECK THE WALL ALIGNMENT BEFORE YOU BEGIN BACKFILLING.

USE 4" TO 8" CLEAN STONE, OR CHECK THE PROJECT SPECIFICATIONS (SOME REQUIRE DIFFERENT SIZES).

PLACE THE STONE IN 9" OR 12" LIFTS (SEE SPECS). SPREAD IT BY HAND TO MINIMIZE VOIDS. TAKE CARE TO KEEP THE BASKETS SQUARE AND THE DIAPHRAGMS STRAIGHT.



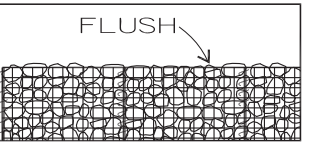
10



IT IS RECOMMENDED THAT THE FILL IN ANY CELL NEVER BE MORE THAN 12" HIGHER THAN THE FILL IN AN ADJOINING CELL.

11

CONTINUE FILLING THE GABIONS IN 12" LIFTS UNTIL THEY ARE FILLED. FILL FLUSH OR SLIGHTLY ABOVE THE TOP OF THE GABION.

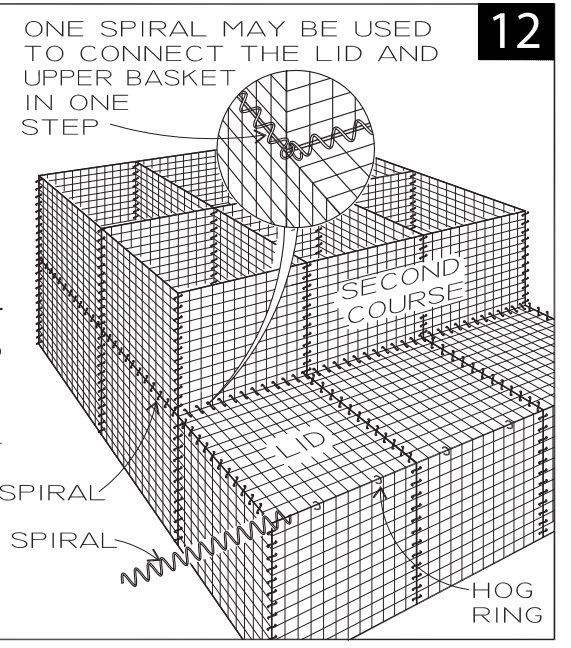


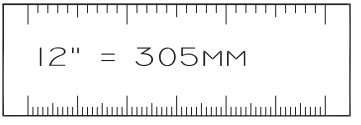
12

LOWER THE LIDS. YOU MAY USE HOG RINGS FOR TEMPORARY CONNECTIONS. INSTALL SPIRALS AT ALL PERIMETER AND DIAPHRAGM EDGES.

PLACE THE NEXT COURSE OF GABIONS. USE SPIRALS TO PERMANENTLY BIND THE FRONT, BACK AND SIDES TO THE FILLED GABIONS OR PER THE PROJECT SPECIFICATIONS.

REPEAT STEPS (4) THRU (12) TO THE TOP OF THE STRUCTURE.





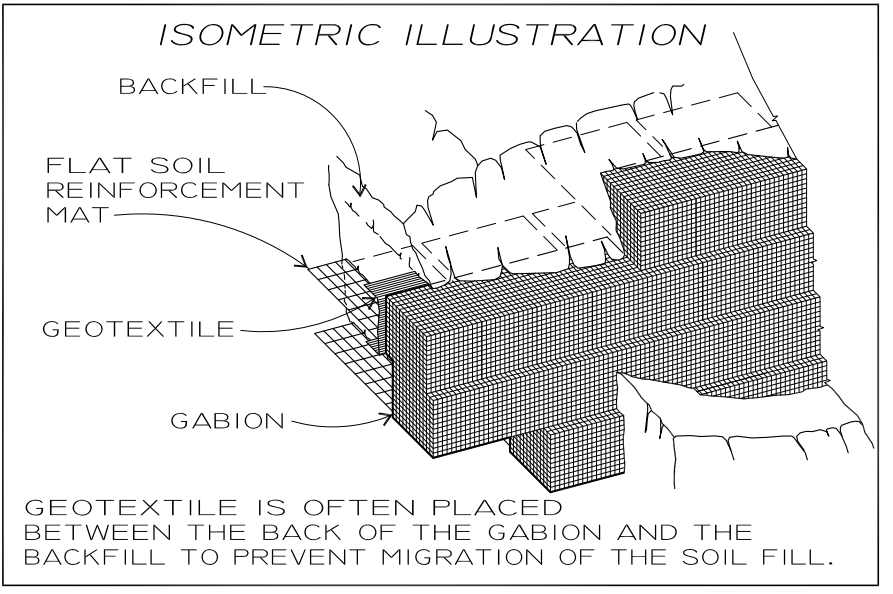
NOTES

GABION-FACED M.S.E. WALL

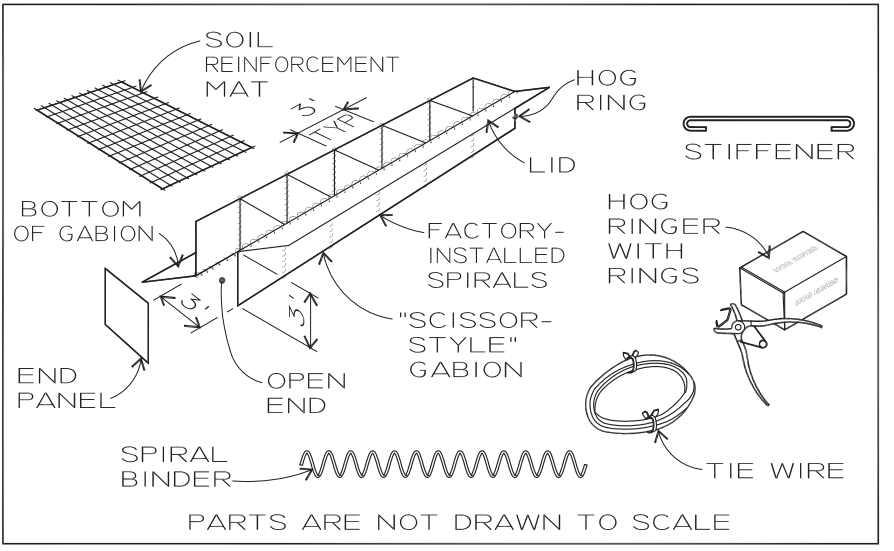
The Hilfiker Gabion Faced M.S.E. Wall combines **ArtWeld Gabions** at the face of the structure, with welded wire soil reinforcement mats spaced vertically at 3-foot intervals.

The "scissor-style" gabions are manufactured in lengths up to 18 feet. "Scissor-style" refers to the folding pattern of the gabions. They are partially pre-assembled at our factory, with the vertical edges of the diaphragms permanently connected to the vertical faces, and the lid and bottom panels connected to the main body along one long side. They are folded flat for shipment.

The wire gauge and length of the welded wire soil reinforcement mats will vary as required for each specific site.

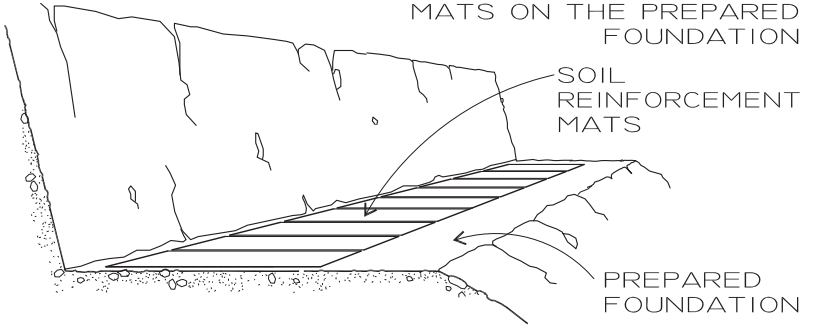


GABION FACED M.S.E. WALL PARTS



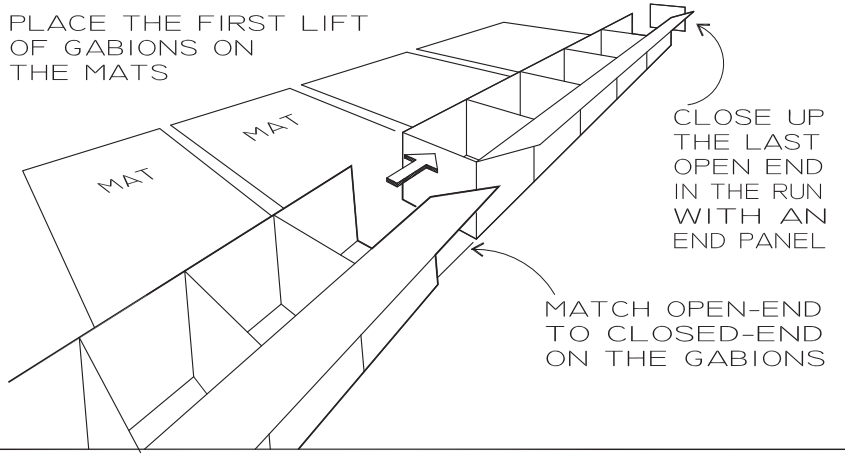
13

BEGIN THE GABION FACED M.S.E. WALL BY PLACING THE SOIL REINFORCEMENT MATS ON THE PREPARED FOUNDATION

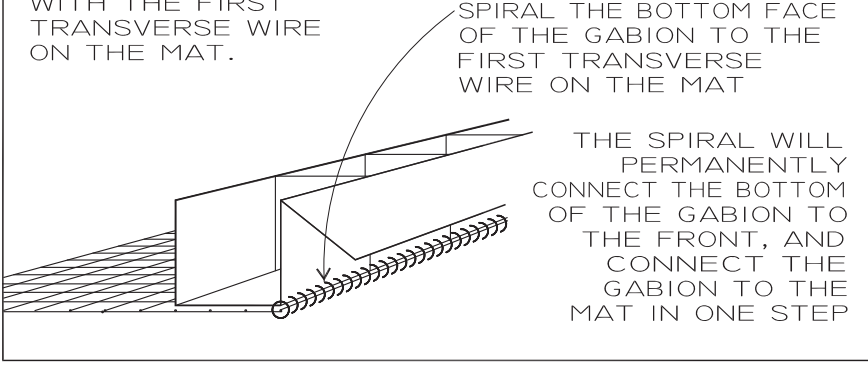


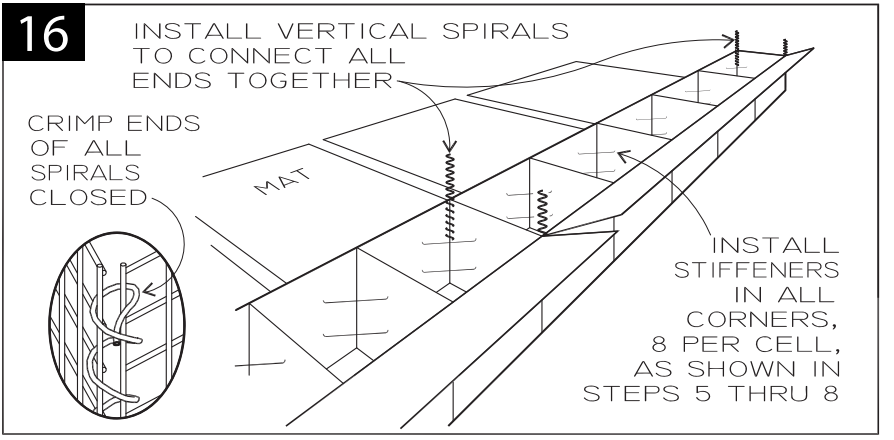
14

UNFOLD THE GABIONS AND CLOSE THE BOTTOM PANELS. YOU CAN CLIP THEM TEMPORARILY WITH HOG RINGS.

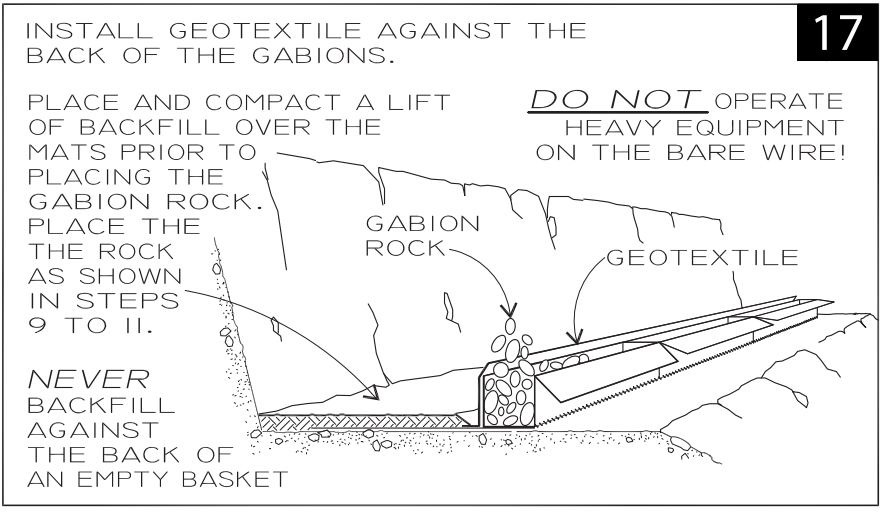


15

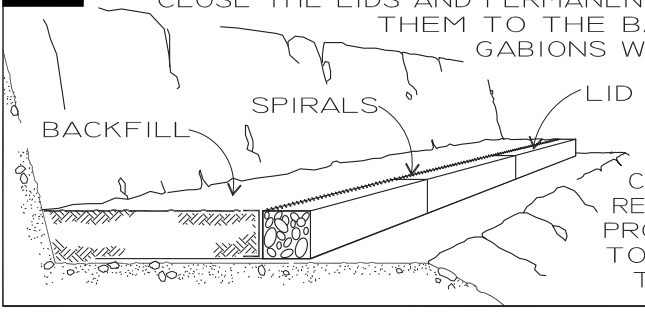




BEGIN THE BACKFILL

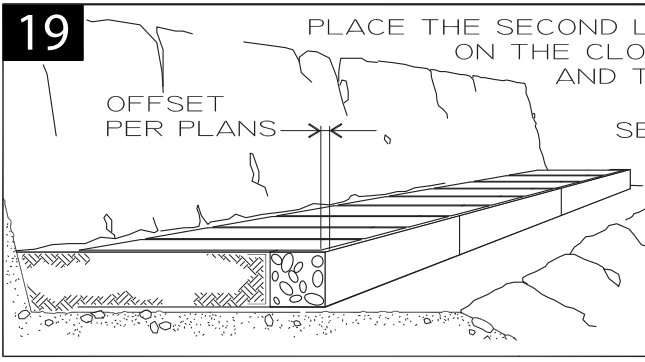


18 WHEN THE GABIONS ARE FILLED WITH ROCK, CLOSE THE LIDS AND PERMANENTLY CONNECT THEM TO THE BACK OF THE GABIONS WITH SPIRALS.



COMPLETE THE SOIL BACKFILL AND COMPACTION AS REQUIRED IN THE PROJECT PLANS TO THE TOP OF THE BASKETS

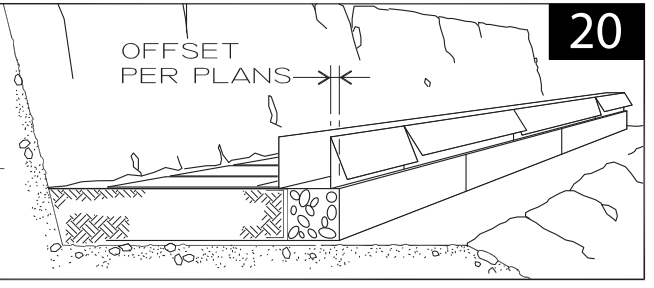
19 PLACE THE SECOND LIFT OF MATS ON THE CLOSED GABIONS AND THE BACKFILL

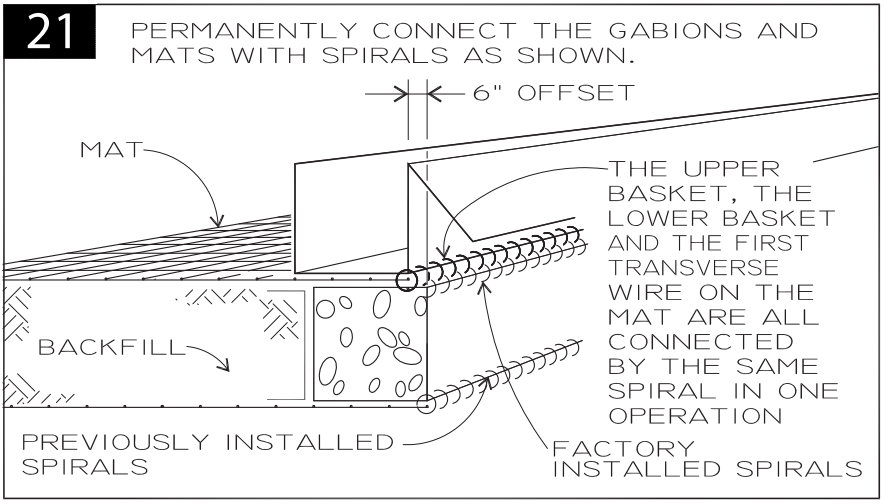


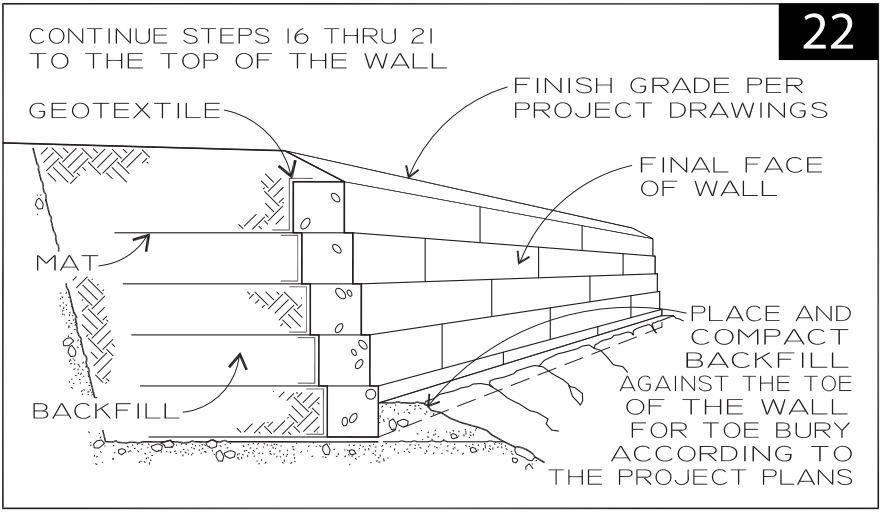
SET THE FIRST TRANSVERSE WIRE ON THE MATS 6" BACK FROM THE FACE OF THE GABIONS. SEE STEP 21.

20

PLACE THE SECOND ROW OF GABIONS ON THE MATS, WITH THE FRONT FACE OFFSET FROM THE GABIONS BELOW

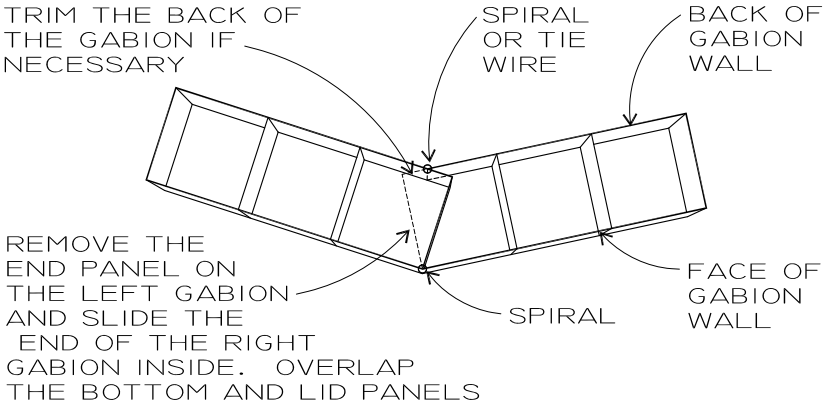



21
PERMANENTLY CONNECT THE GABIONS AND MATS WITH SPIRALS AS SHOWN.
6" OFFSET
MAT
THE UPPER BASKET, THE LOWER BASKET AND THE FIRST TRANSVERSE WIRE ON THE MAT ARE ALL CONNECTED BY THE SAME SPIRAL IN ONE OPERATION
BACKFILL
PREVIOUSLY INSTALLED SPIRALS
FACTORY INSTALLED SPIRALS

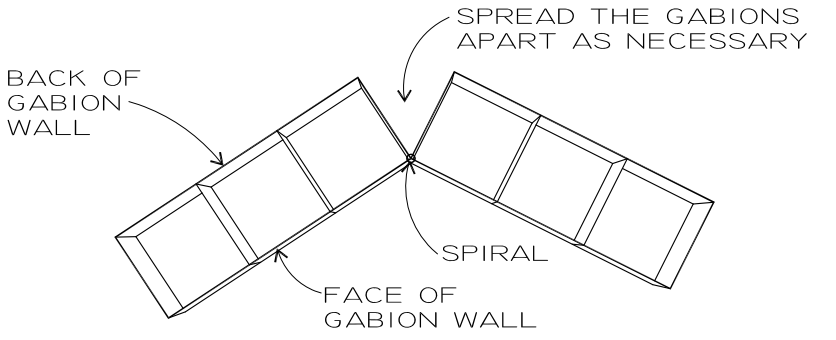

22
CONTINUE STEPS 16 THRU 21 TO THE TOP OF THE WALL
GEOTEXTILE
FINISH GRADE PER PROJECT DRAWINGS
FINAL FACE OF WALL
MAT
PLACE AND COMPACT BACKFILL AGAINST THE TOE OF THE WALL FOR TOE BURY ACCORDING TO THE PROJECT PLANS
BACKFILL

FORMING ANGLES WITH GABIONS

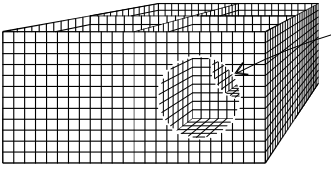
TO FORM A CONVEX ANGLE
(PLAN VIEW LOOKING DOWN ON THE WALL)



TO FORM A CONCAVE ANGLE
(PLAN VIEW LOOKING DOWN ON THE WALL)



PIPE PENETRATION THRU GABION



CUT A HOLE THRU THE WALLS OF THE GABION, THE SAME SIZE AS THE OUTSIDE DIAMETER OF THE PIPE

EXTERIOR GABION

PUSH THE PIPE THRU THE HOLES AND INSTALL TIE WIRE ACROSS THE FACES OF THE EXTERIOR GABIONS AS SHOWN, APPROXIMATELY 9" APART

TIE WIRE

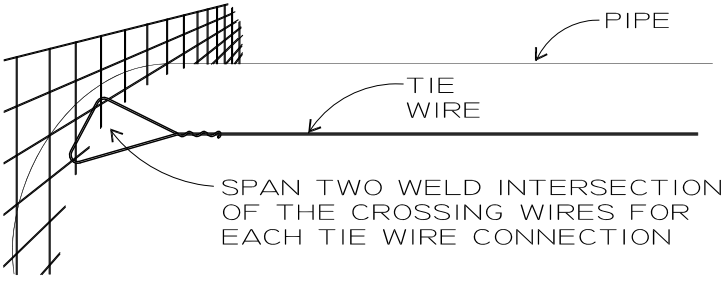
PIPE

PLACE ROCK UNDER AND AROUND THE PIPE

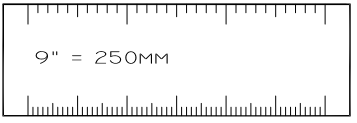
TIE WIRE

EXTERIOR GABION

PLAN VIEW



SPAN TWO WELD INTERSECTIONS OF THE CROSSING WIRES FOR EACH TIE WIRE CONNECTION



GABION WIRE SPECIFICATIONS

USA WIRE GAUGE	DIAMETER, INCHES	MINIMUM ALLOWABLE AVERAGE GABION WIRE DIAMETER WITH CLASS 3 ZINC-COATING, INCHES
9	.148	.144
11	.120	.116
13.5	.086	.082 (STANDARD TIE WIRE)

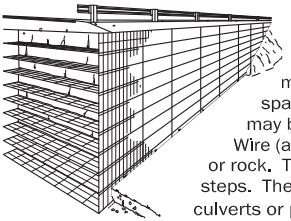
SOIL REINFORCEMENT MAT WIRE SIZE COMPARISON TABLE

"W" SIZE NUMBER	NOMINAL DIAMETER (INCHES)	NOMINAL DIAMETER (MM)
W12.0	.391	9.9
W9.5	.348	8.8
W7.0	.299	7.6
W4.5	.239	6.1
W4.0	.226	5.7
W3.5	.211	5.4

FOR MORE INFORMATION ON WELDED WIRE REINFORCEMENT (WWR) CHECK THE WEBSITE FOR THE WIRE REINFORCEMENT INSTITUTE. WWW.WIREREINFORCEMENTINSTITUTE.ORG

HILFIKER MSE WALL SYSTEMS

OTHER HILFIKER PRODUCTS

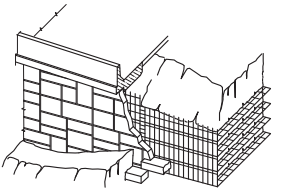


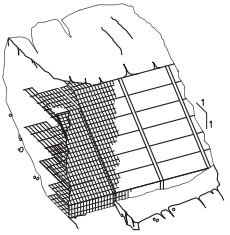
WELDED WIRE WALL

The Hilfiker Welded Wire Retaining Wall is a flexible soil reinforcement system. It is composed of Welded Wire Mesh mats and compacted soil. Mats are supplied in 8' (2.44m) spans, and 24" (610mm) horizontal lifts. The final wall face may be vertical or battered, and may remain exposed Welded Wire (as shown) or may be covered with air-blown mortar, plants or rock. The Welded Wire Wall is adaptable to curves, angles and steps. The mats are easily cut to permit installation of penetrating culverts or pipes, or to fit special site applications.

EUREKA REINFORCED SOIL (E.R.S.)

The Hilfiker E.R.S. Retaining Wall begins as a Welded Wire Wall, with the addition of face anchors to tie to a concrete face. After completion and settlement of the Welded Wire Wall, a solid facing is attached. This may be cast-in-place concrete, precast full-height concrete panels, or special rock or gunite as required by the project specifications. The facial treatment of this retaining wall adapts easily to almost any pattern or concept.

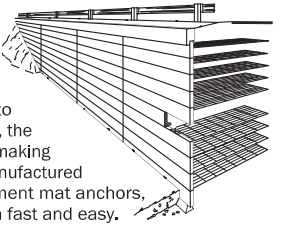




HILFIKER STEEPENED SLOPE

The Hilfiker Steepened Slope system is composed of Welded Wire Fabric components. The flat primary soil reinforcement mats are interlocked with bent facing mats, prefabricated to a 1:1 slope. The slope may be flattened, if desired, by stepping back each layer. Behind the facing mats are Welded Wire Fabric backing mats incorporated with erosion mat or sod. Virtually any type of sod or vegetation that will best suit the environment may be used with this sytem. Low-growth, maintenance–free vegetation is typically specified.

REINFORCED SOIL EMBANKMENT (SMOOTH FACE)



The R.S.E. Smooth Face Retaining Wall retains most of the advantages of the Hilfiker Welded Wire Wall, while providing the additional durability of precast face panels.
The concrete panels can be cast with a smooth finish, or to match a variety of architectural treatments. In most structures, the simple 12'-6" x 2'-6" (3.81m x 0.76m) standard panel is used, making all the panels interchangeable. Special panel sizes can be manufactured when required. Panels are cast with pre-installed reinforcement mat anchors, and a cantilever footing at the back face, making installation fast and easy.

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Web: Http://hilfiker.com email: Info@hilfiker.com

MATERIAL WARRANTY FOR HILFIKER SYSTEMS

Hilfiker Retaining Walls warrants that all retaining wall and gabion materials manufactured by Hilfiker shall be free from defects in design and workmanship and shall conform in all respects to one or more of the following applicable specifications:

ASTM	AASHTO	Standard Specification Description
A1064 *	M 336 **	Steel Wire and Welded Wire, Plain and Deformed
A53		Steel Pipe
A500-03a		Steel Tubing
A36		Carbon Structural Steel
A370	T 244	Test Methods & Definitions for Mechanical Testing of Steel Products
A123	M 111	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products (2 oz. / SF galvanization)
A641		Zinc–Coated (Galvanized) Carbon Steel Wire (class 3 galvanization)
A740 - 98(2014)		Hardware Cloth (Woven or Welded Galvanized Steel Wire Fabric)

**ASTM A82 and A185 were combined in 2010 into A1064*
***AASHTO M 32 and M 55 were combined in 2018 into M 336*

It is assumed that construction and workmanship meet all material requirements and specifications as provided by Hilfiker. All backfill materials are provided by the Contractor who is solely responsible for the material quality and the installation of the backfill. Not covered by any implied or express warranty would be foundation settlement, settlement of the backfill, erosion of the foundation soils, or corrosion of the reinforcement due to the use of non-conforming backfill, and other external stability matters. Hilfiker Retaining Walls cannot offer a performance warranty because we have no control over the wall materials after delivery to the jobsite.

The design associated with this warranty was based on information provided to Hilfiker and their consulting engineer by the Owner/Contractor. The consulting engineer who prepared the associated design has a valid license and provides professional liability coverage. Their obligation is to live up to the standard of practice (standard of care) for the given geographic location at the time the service is, or was provided. Alterations to their design submittals, without prior approval, will nullify any responsibility on their part.

Hilfiker Retaining Walls requires that the wall components are manufactured to the stipulated ASTM standards as well as internal quality assurance standards for fabrication. However, we do not exercise control over the construction, use, or the service conditions to which the wall is subjected and thus would void our insurance by attempting to extend coverage into areas for which we have no control.

Updated: August 12, 2019