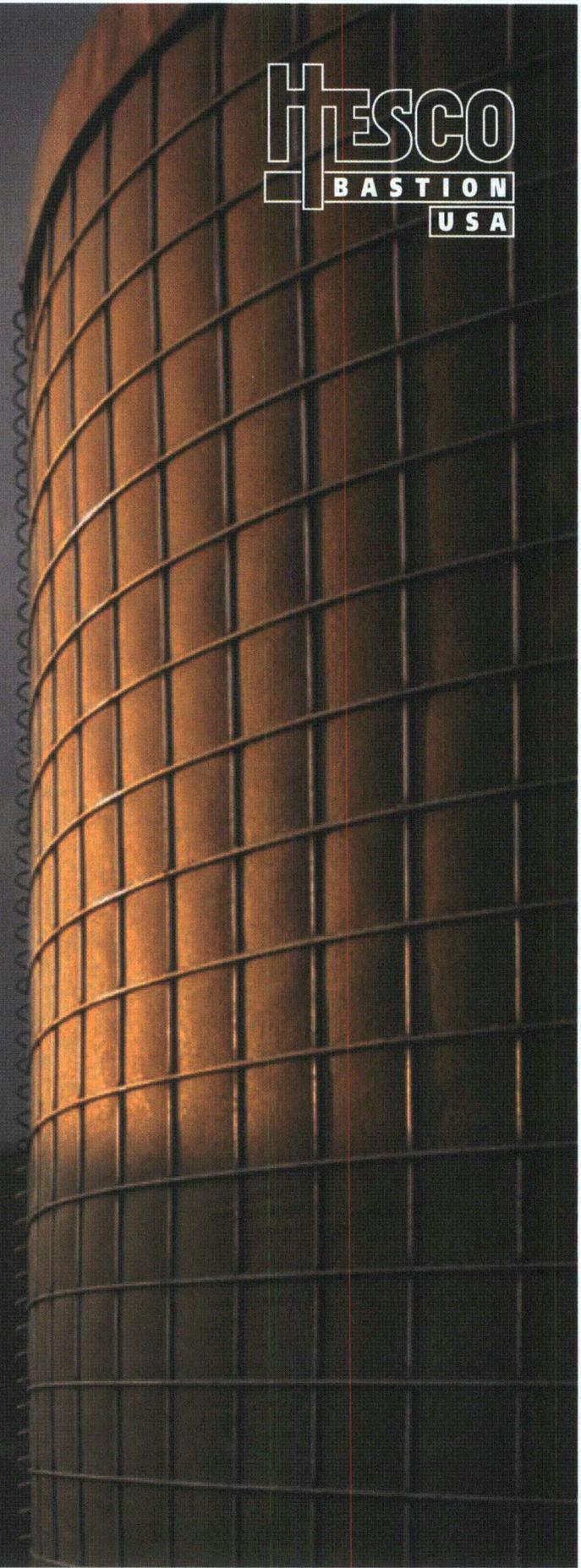
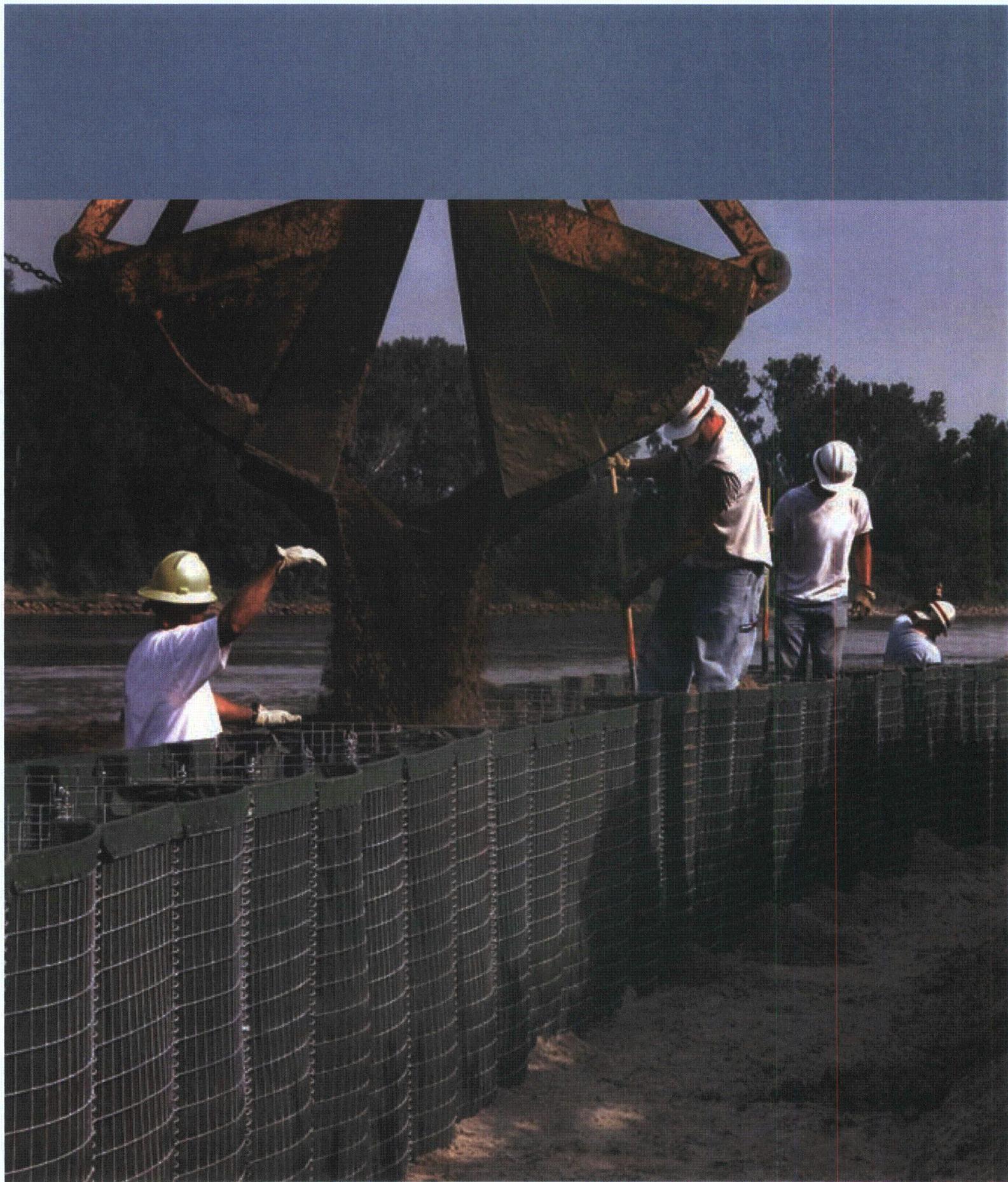


**ENCLOSURE 4**

**HESCO Bastion USA, HESCO Concertainer Brochure, February 2009**

HESCO Concertainer  
protecting people,  
places and  
property





## Contents

- 2 Protecting people, places and property
- 4 Performance through design
- 6 Simple, rapid construction
- 8 Tested to the limit
- 10 Proven in the field
- 12 Flood protection
- 16 77 hours or 20 minutes
- 18 Storm protection
- 22 Homeland security
- 28 Architectural projects

HESCO® Concertainer®  
protecting people,  
places and  
property



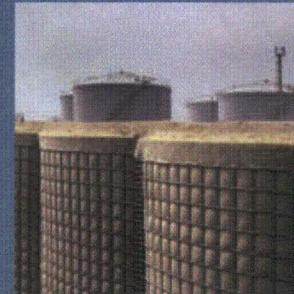
What stands between people or property and any natural or man-made force must be secure, quick to respond and above all, reliable. HESCO Concertainer units provide a unique way of positioning and containing large volumes of earth, sand, gravel or rock, to form either temporary or long-term structures.

During the past two decades, the HESCO Concertainer unit has become the system of choice for applications as varied as field fortifications and perimeter defenses, ammunition compounds and firing ranges, homeland security and infrastructure protection, land reinforcement and architectural projects, emergency flood protection and flood prevention.

Key to this versatility is the simplicity of its globally patented design. HESCO Concertainer units have a steel mesh framework, lined with non-woven polypropylene material, with integrated cells to provide internal structural integrity. The vertical joints are made from helical coils, to form 360 degree hinges.

The result of this unique combination of components is that the units fold flat when empty, so that several can be carried on a standard pallet or skid, making transportation and positioning efficient and rapid. As the units are already pre-assembled, once on site they can be filled with locally available materials such as earth, sand, gravel or rock, with minimal manpower and using standard front-end loaders or similar equipment.

Left  
HESCO Concertainer units are widely used in the protection of the personnel and assets of the United States armed forces and its allies.



Concertainer units have hinged joints so the empty units fold flat for transportation, ready for rapid deployment and filling on site.

Performance through design



The HESCO Concertainer unit is a multi-cellular wall system manufactured from welded Alu-Zinc coated steel wire mesh and joined with vertical, helical coil joints.

The units are lined with a heavy-duty non-woven polypropylene geotextile, available as standard in either sand or green, which can be filled with almost any locally available soil or granular material.

Flexibility for multiple fill content

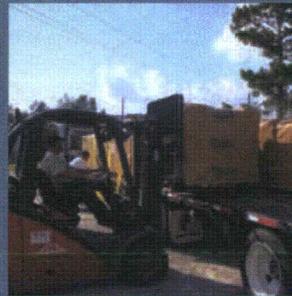
The individual cells are joined at the factory to make standard length units. These can then be joined on site to make structures of limitless length to a wide range of profiles. Each consignment of Concertainer units is supplied with joining pins to enable the individual units to be connected.

Packs flat for ease of transportation

Such is the versatility of the design, the concept of the Concertainer system has been applied to a number of different products that provide solutions for both temporary and long-term structures in a variety of environments.



Geotextile liners allow units to be filled with fine-grained material, making them ideal for flood walls and low cost structures.



A C-3315 weighs only 105lbs un-filled. An average truck load of 350 C-3315 units can create a volume of over 47,000ft<sup>3</sup> when filled.

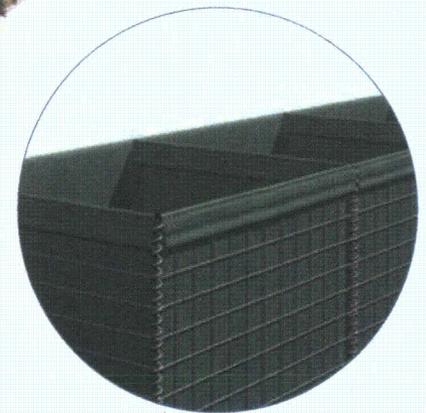
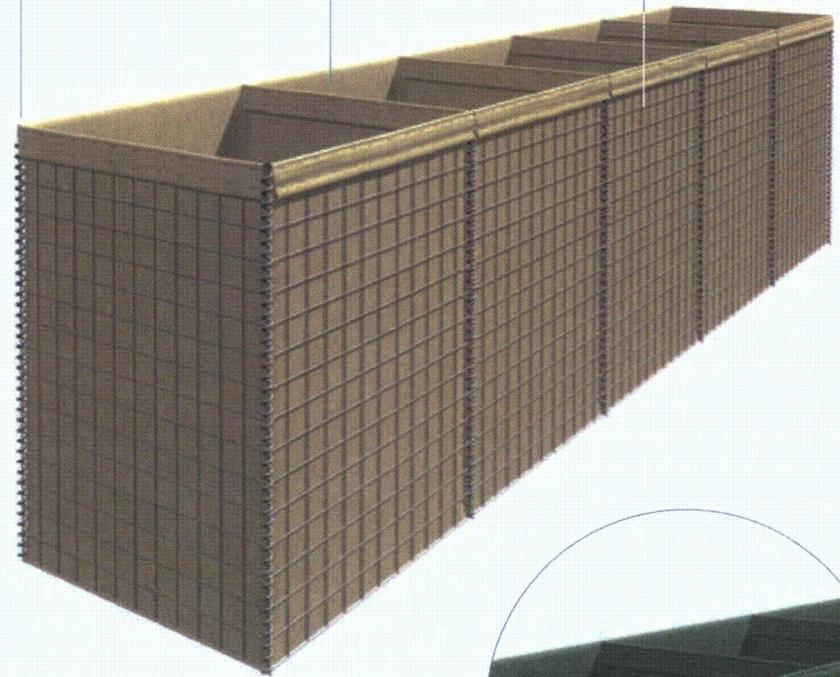


HESCO Concertainer units can be both lined or unlined allowing a wide range of fill material, from earth or sand to large rock and stone material.

Spiral hinged corners

Non-woven geotextile liner

Welded mesh frame

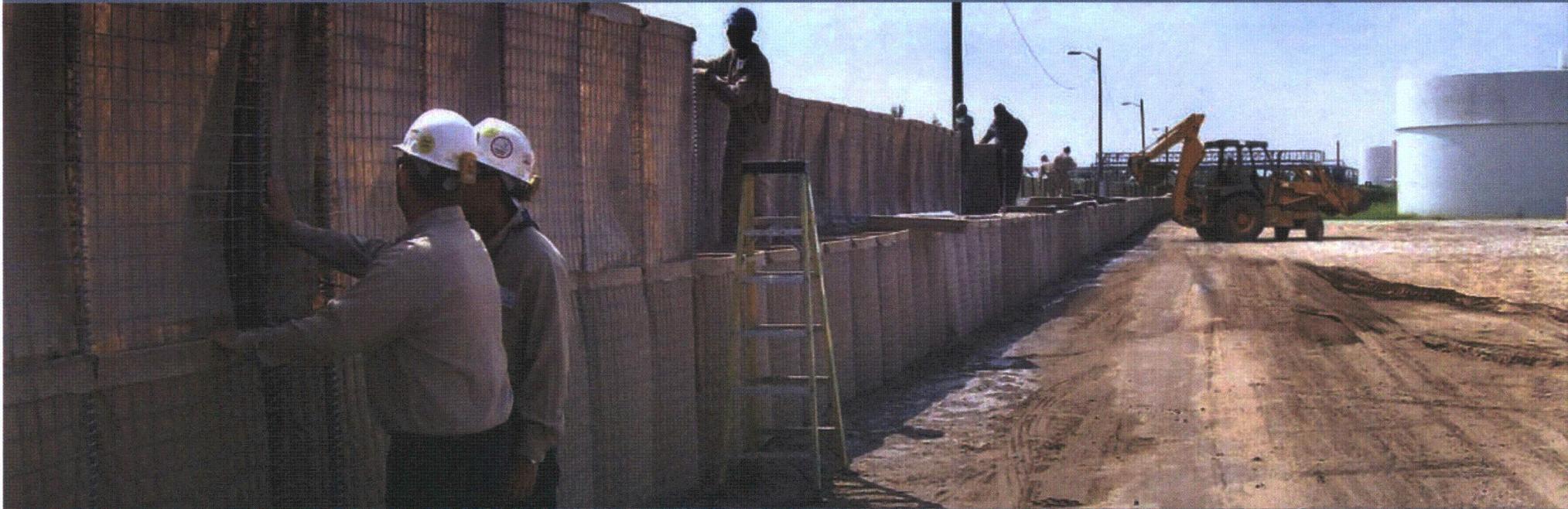


The Concertainer unit is shown above and right, with the standard sand or green geotextile color. The product range also includes the Concertainer Floodline™ unit, a specialized flood unit, which has open mesh internal diaphragms to minimize water seepage. The range is further extended by the inclusion of the Concertainer Rockface™ units and Concertainer Rockbox™ units; these are part-lined and unlined units for use in architectural, landscaping and civil engineering projects.

Simple, rapid construction

"The HESCO barrier's performance during the flood was remarkable and superior to other flood prevention systems. The ease and speed with which the barriers were erected saved a great deal of time and energy."

Jeff Harney, Construction Manager, Planning, Design and Construction, University of Iowa



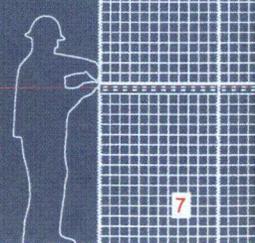
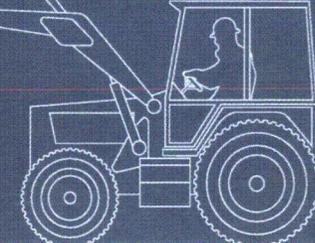
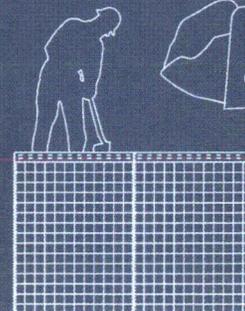
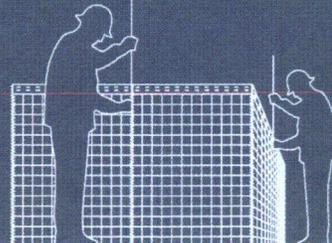
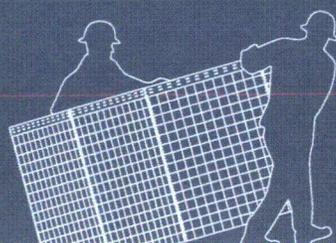
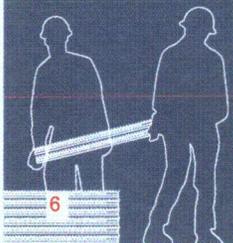
1 Unpack

2 Pull out and set up

3 Connect together

4 Fill and compact

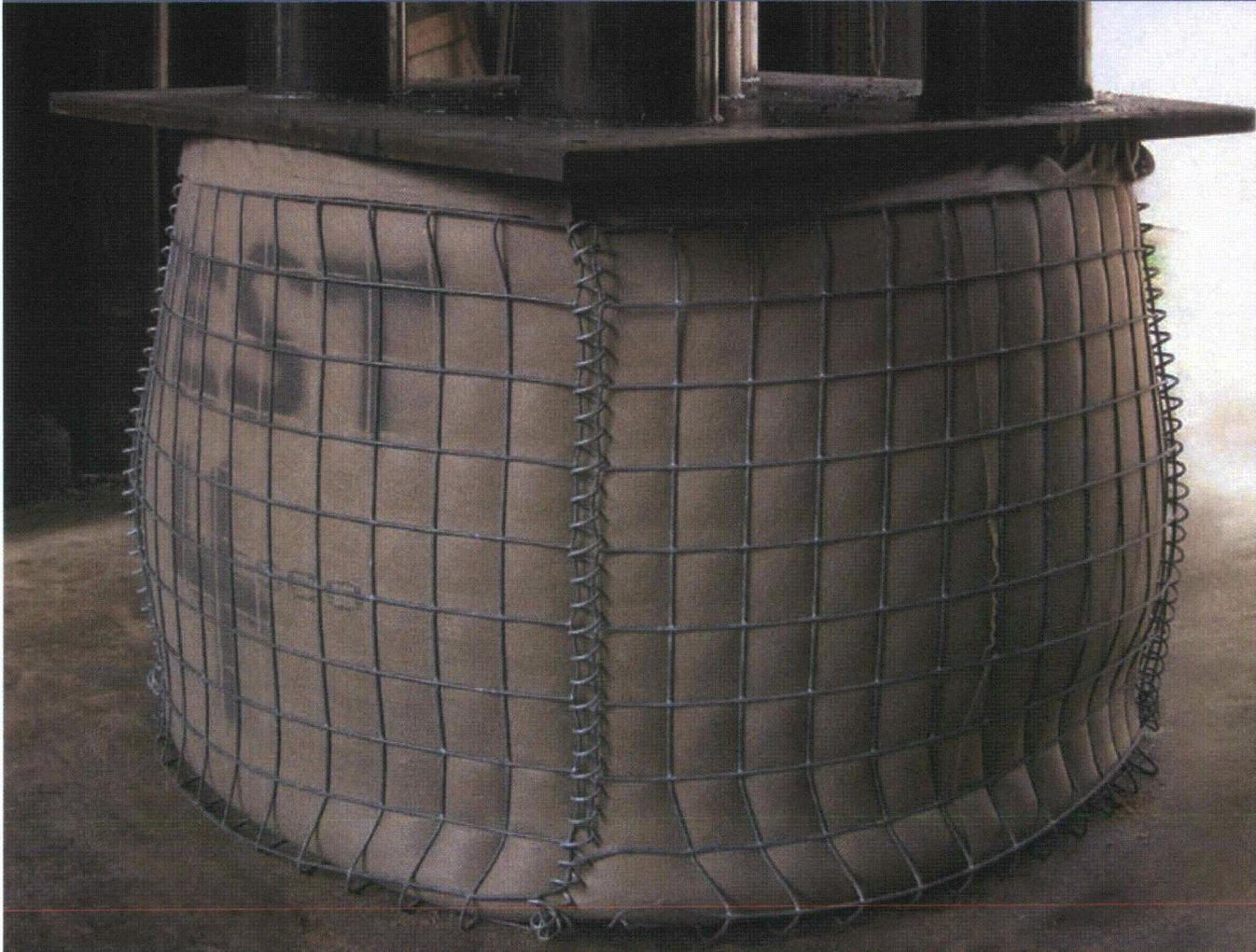
5 Add layers if required



Tested to the limit

"The HESCO Bastion structures were constructed much faster and with much less labor force than the sandbag structures."

From the *Flood Fighting Structures Demonstration and Evaluation Program* report. Tests conducted by US Army Corps of Engineers.



Concertainer units have undergone an intensive series of laboratory and field tests and have been assessed by leading authorities in the US and worldwide.

Tests in the US include those undertaken as part of a research program into temporary flood-fighting structures. The research was conducted by the US Army Engineer Research and Development Center (ERDC). The resulting report concluded that HESCO Concertainer units had significant advantages over traditional sandbags in terms of cost, time and labor requirement for installation, and also outperformed other alternative systems in many areas tested.

K12 is the certification of a structure against vehicle impact. A barrier is tested to demonstrate that it will stop a truck with a 15,000lb gross vehicular weight (gvw) traveling at a nominal 50mph. In 2004, a HESCO Concertainer barrier met the required standard and, as a result, HESCO Concertainer was awarded K12 certification by the US Department of State. In 2005, a larger barrier met the requirements of the H50 standard by stopping a truck with a 65,000lb gvw traveling at 50mph. The trials were conducted by the Texas Transportation Institute.

Main picture  
Compression and load bearing test to 4 x WORKING LOAD  
USACE, Vicksburg, Mississippi.

Above left  
At the USACE Flood Testing Facility in Vicksburg, Mississippi, a HESCO Concertainer unit wall was constructed and filled with sand.

The flood chamber was filled on the outer side of the structure with increasing levels of water, up to three quarters of the units' height; the units were then 'overtopped' with a wave simulator.

Finally, the structure was hit with a 12" diameter log at 5 mph to simulate typical large debris found in flood water. Throughout all of these tests the wall remained intact.

Above right  
As well as flood and loading tests, Concertainer units have been successfully tested against vehicle impact in several countries.

Flood protection

Storm protection

Wetland restoration

Homeland security projects

Architectural and landscaping projects

Civil engineering projects



10



11

## Flood protection



In the event of a flood warning, HESCO Concertainer units can be deployed quickly and easily to construct flood defenses without the need for specialist tradesmen or equipment - making it ideal for emergency response.

Whether the increase in water level is gradual or due to sudden surge, Concertainer units and Floodline units provide a comprehensive solution to a wide range of flood defense requirements.

The unique design, strength and versatility of the standard Concertainer unit and the specialized Floodline unit means that corners, curves and angles can be easily constructed and there is no limit to the height or length of a HESCO Concertainer wall, provided that space for sufficient base width is available.

**Above**  
There is no limit to the length of a HESCO Concertainer installation.

**Opposite**  
A levee lift project at East Jefferson Levee District, LA. Engineers inspect a section of wall to check installation prior to filling.





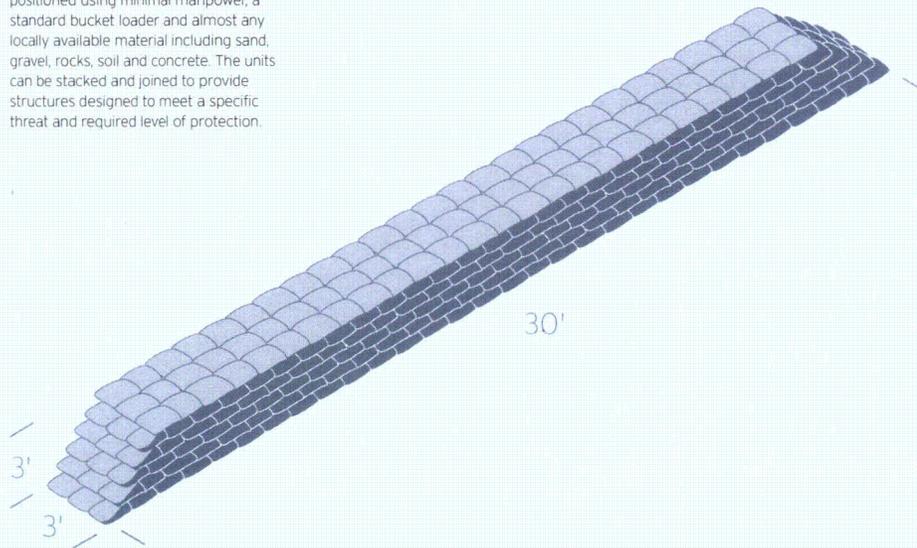
Location	Iowa City, IA
Units	C-3315 and C-4315
Project	Flood protection

# 77 man hours

To react effectively to emergency situations, speed and efficiency are of paramount importance. The innovative design of the Concertainer unit makes them quick and easy to transport and deploy without the need for trained labor or specialized equipment.

Unlike sandbags, the units can be filled and positioned using minimal manpower, a standard bucket loader and almost any locally available material including sand, gravel, rocks, soil and concrete. The units can be stacked and joined to provide structures designed to meet a specific threat and required level of protection.

A typical wall of Concertainer units, equivalent to 1500 sandbags, can be erected and installed by two men using a standard front loader in just 20 minutes. A similar wall made with sandbags would take ten men around seven hours to build.

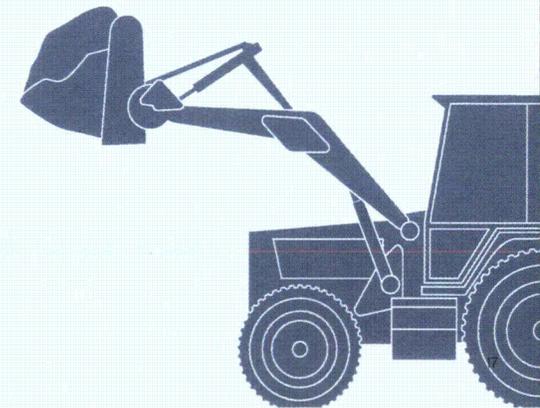
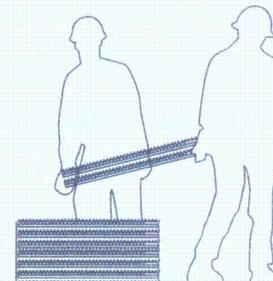
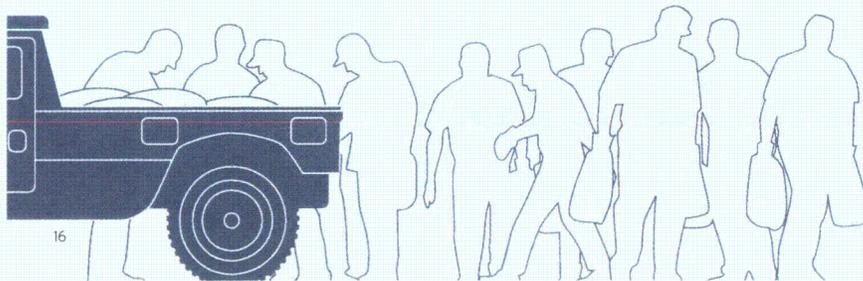
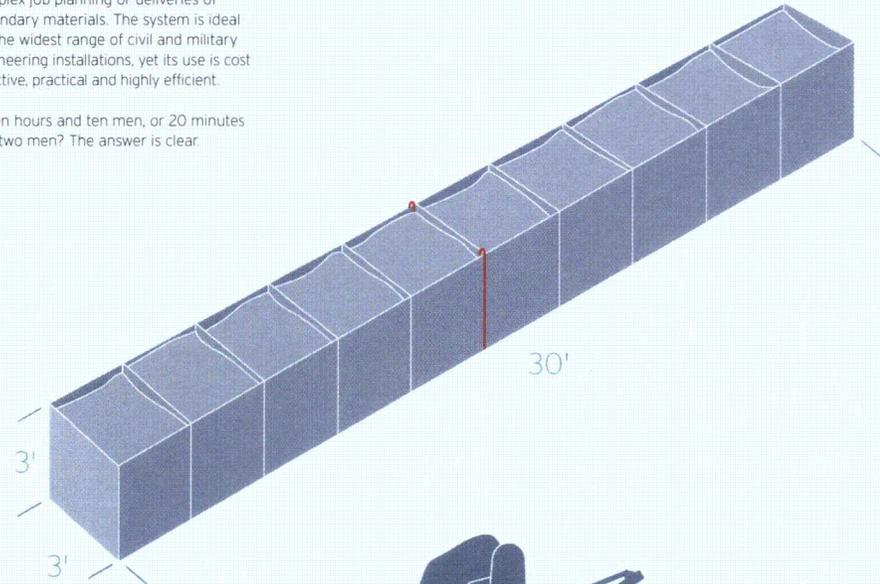


# 20 man minutes!

When empty, Concertainer units are compact and relatively lightweight, which makes them well suited for use where site access is limited. If necessary, each empty Concertainer unit can be manhandled into position before being erected and filled.

Walls and protective barricades can be built very quickly, with little need for complex job planning or deliveries of secondary materials. The system is ideal for the widest range of civil and military engineering installations, yet its use is cost effective, practical and highly efficient.

Seven hours and ten men, or 20 minutes and two men? The answer is clear.



## Storm protection



Hurricanes Katrina and Gustav and the 500-year flood in the Midwest are recorded as the largest natural disasters to hit the US in the past decade.

Storm rains and storm surge can cause inland water levels to rise very quickly, leaving little time to react to the situation.

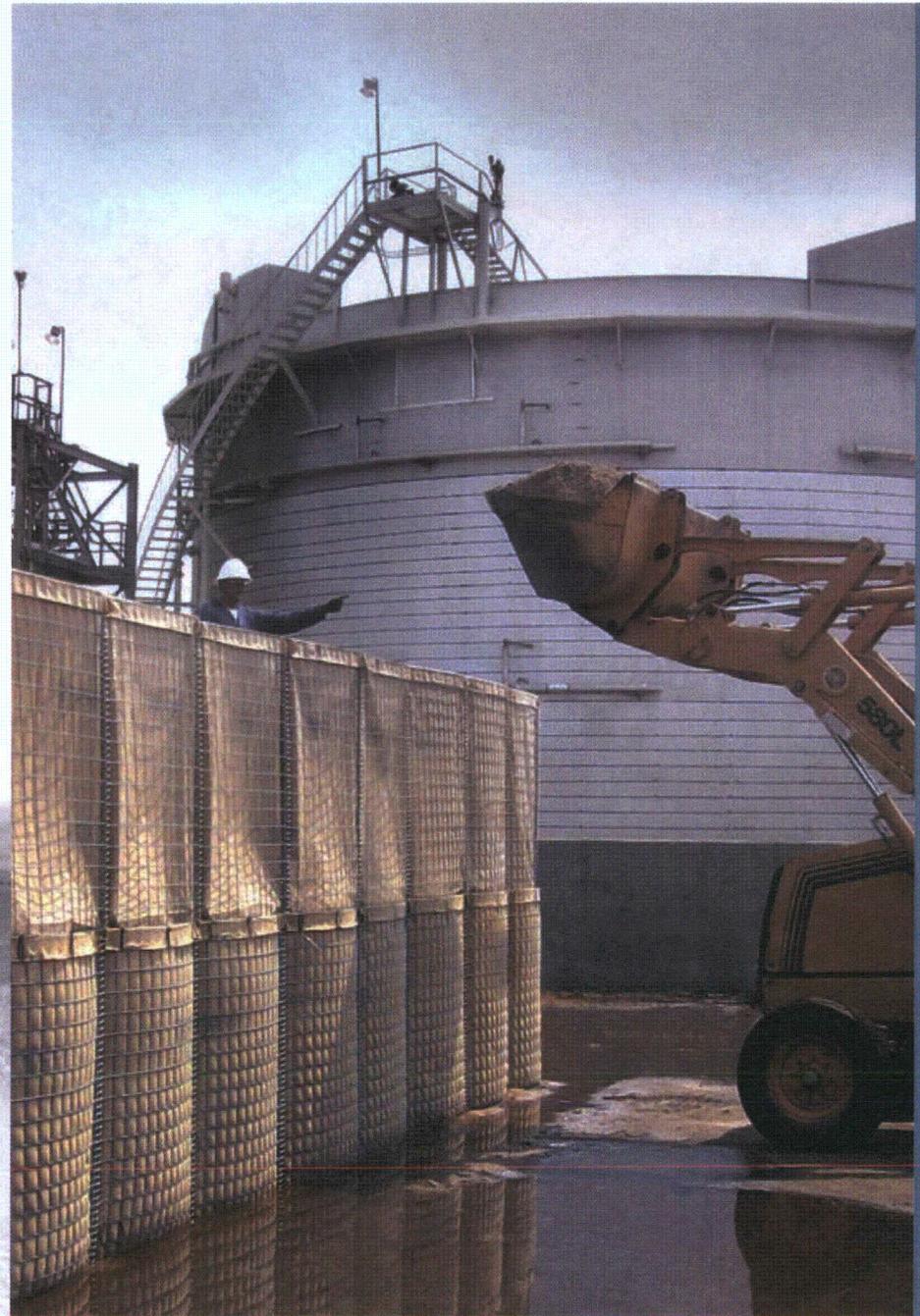
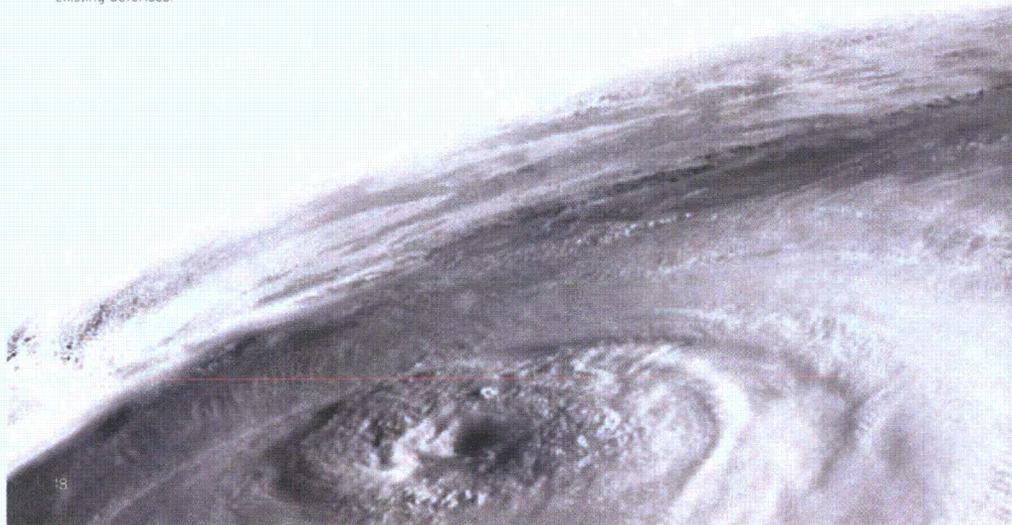
Fast and simple to install, versatile and effective in their uses, HESCO Concertainer flood barriers can be constructed rapidly to form new flood walls or to improve existing defenses.

With a range that can provide both segmented and continuous fill options, HESCO Concertainer flood protection walls can be used to protect against both gradual and sudden increases in water levels.

And where a long-term structure might be required such as on a river or canal bank, Concertainer units can be planted with suitable grasses and other vegetation to form a natural landscape as well as a protective structure.

Above  
Over five miles of Concertainer units were deployed in Plaquemines Parish, Louisiana as Hurricane Gustav approached.

Opposite  
Storm protection projects include protecting critical infrastructure.





Location	Slidell, LA
Units	C3315 and C4315
Project	Property elevation

# 50mph

# 00mph!



C-4376 units being tested for K12 certification

## Concertainer units stop trucks... dead.

HESCO Concertainer units have been extensively tested by civilian and military authorities across the world to prove their suitability for protection in a diverse range of military, homeland-security and environmental applications.

Vehicle barrier trials are independently conducted to meet the standards of the US Department of State and ASTM. These trials are conducted under strict conditions, during which Concertainer units are subjected to direct vehicle impact.

In the K12 test a structure must stop a truck with a 15,000lb gross vehicular weight (gvw) travelling at a nominal 50mph. HESCO Concertainer units stopped the truck in under a second.

In further trials at the Texas Transportation Institute, a larger HESCO barrier stopped a 65,000lb truck travelling at 50mph, meeting ASTM H50 standard.

[www.hesco-usa.com](http://www.hesco-usa.com)

## Homeland security

HESCO Concertainer units have been widely and successfully used for force protection in conflicts from Bosnia to Afghanistan. Walls built from the units have been used around military camps, guard posts, hospitals, stores and key public buildings such as embassies and consulates.

Across the world, this success has prompted the use of Concertainer systems to protect sensitive civilian installations particularly at risk from terrorist attack such as embassies, consulates, government buildings, oil refineries, production and processing installations, and power stations.

This was endorsed in the National Strategy for the Physical Protection of Critical Infrastructure and Key Assets, issued by the Department of Homeland Security, which identified key facilities which must be secured against the threat of physical attack, where disruption could have "significant impact on public health and safety, public confidence, and the economy."

In addition, the Strategy identifies prominent commercial centers, office buildings, and sports stadiums, where protection is important to prevent fatalities and preserve public confidence.

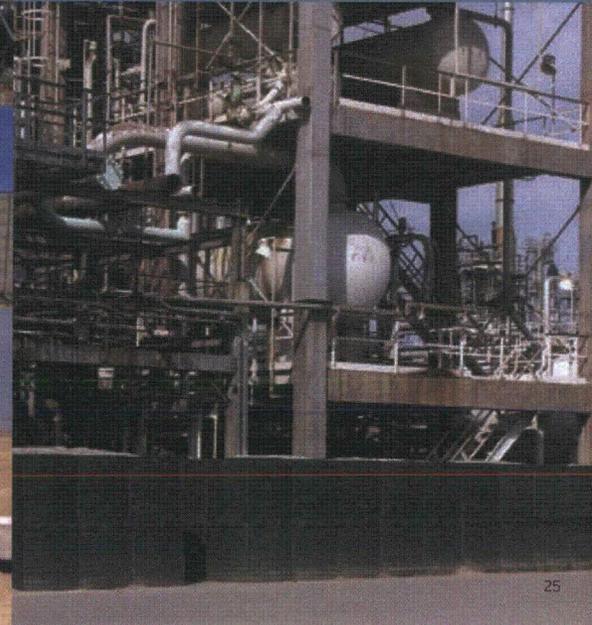
Providing proper protection for these sensitive buildings is a key element in being "ready, not afraid" that lies at the heart of homeland security. HESCO Concertainer units have provided this kind of protection in the harshest environments and under the most testing conditions of all - those of military combat.

Since Concertainer units can be filled with soil and organic material, they can support the growth of natural plants, maintaining the local ecological balance and providing a 'green' environment. This is in contrast to conventional concrete installations which are unnatural, unattractive and environmentally unsound.

The benign appearance does not affect the defensive qualities of walls built with Concertainer units: instead, the plantings merely hide the structure, enabling it to form a seamless part of the environment.



- Proven in combat situations
- Perimeter protection
- Protection of assets
- Vehicle impact control
- Entry control barriers
- Infrastructure protection
- Explosive storage protection
- Target ranges





Location	Pointe-Aux-Chenes, LA
Unit	C-3315
Project	Levee breach repair



HESCO Bastion USA's products are available in a range of standard sizes. Non-standard sizes are available on request. For more information visit our website at:

[www.hesco-usa.com](http://www.hesco-usa.com)

**Disclaimer**

The information provided by HESCO Bastion USA herein is intended solely to provide general guidance to a purchaser or potential purchaser, who accepts full responsibility for the design, installation and use of structures incorporating the HESCO Concertainer and associated products. While reasonable care has been taken to ensure that the information provided is accurate and has been obtained from reliable sources, and the information is provided in good faith based upon that which is available at the time of production, HESCO Bastion USA provides no guarantee or warranty as to the accuracy, completeness or effectiveness of the information. Nothing herein shall be construed as a substitute for the need for purchasers to exercise or employ adequate independent technical expertise and judgment for their particular application. As a condition to purchase, each purchaser acknowledges that risks and dangers may arise from foreseeable and unforeseeable causes and assumes all risk and danger and all responsibility for any losses and/or damages to person or property that may result from purchaser's use of HESCO Bastion USA's products. HESCO BASTION USA PROVIDES NO GUARANTEE OR WARRANTY, WHETHER EXPRESS OR IMPLIED BY LAW, IN CONNECTION WITH ITS SALE OR THE INFORMATION HEREIN, INCLUDING WITHOUT LIMITATION MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXCEPT AS EXPRESSLY STATED IN ITS STANDARD TERMS AND CONDITIONS OF SALE.

© Copyright 2009.

International and US Patents apply. All Patents, Trademarks and Copyrights used under license.



**North America Civil Inquiries**

HESCO Bastion USA

47152 Conrad E. Anderson Drive

Hammond, LA 70401

Tel: 985-345-7332

Fax: 985-345-7377

Email: [info@hesco-usa.com](mailto:info@hesco-usa.com)

Web: [www.hesco-usa.com](http://www.hesco-usa.com)

**ENCLOSURE 5**

**HESCO Bastion USA, Technical Specification Sheets**

- a. Concertainer units, February 2009**
- b. Floodline units, February 2009**
- c. Rockface unit - RF-3315, February 2009**
- d. Rockbox units, February 2009**

# Technical specification sheet

## Concertainer® units



A geotextile lined unit for general use as an earth filled gabion, the units are suitable for filling with earth, sand, gravel, crushed rock and other granular materials. The units are suitable for a wide range of uses, including the construction of walls and barriers, flood protection, erosion protection, protection against accidental explosions and Homeland Security applications.

### General specifications

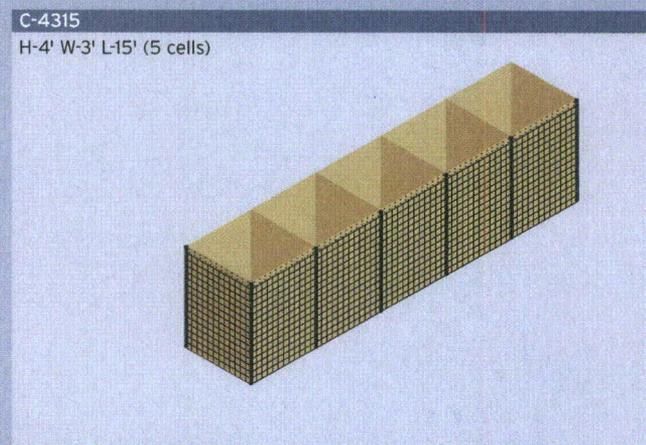
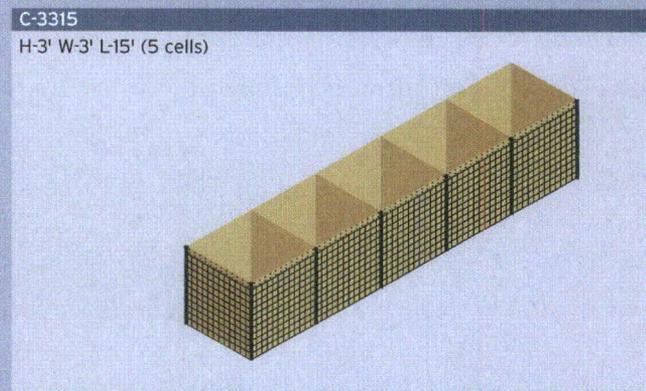
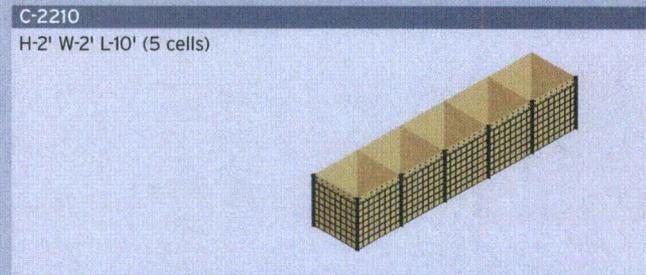
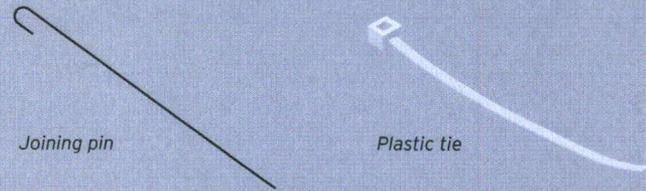
Geotextile lined welded wire fabric gabion to ASTM A 974-97. The geotextile is a heavy-duty, non-woven, permeable, polypropylene fabric, available in either green or sand color.

Welded wire mesh	
<b>Wire</b>	
Wire gauge	8.5 American SWG, steel
Wire diameter <sup>1</sup>	0.155"/3.937mm
Tensile strength of wire	80 - 110 ksi 550 - 760 kPa
Corrosion Protection	Zn-5Al-MM to ASTM A 856A/A 856M-03 minimum coating weight 0.8oz/ft <sup>2</sup> / 240g/m <sup>2</sup>
<b>Mesh</b>	
Wire spacing	3" x 3"
Tolerance on line wire spacing	+/- 1/8"
Cross wire straightness across test panel	limit of deviation 1/4" in 72"
Mesh strength	70% of wire tensile strength
<b>Panels</b>	
Squareness	in 4' diagonals shall not vary by more than 5/8"
Flatness	in 6' not more than 2" from plane

<sup>1</sup>Wire diameter is nominal

Geotextile	Standard	Value
<b>Mechanical Properties</b>		
Grab Tensile Strength (Machine Direction)	ASTM D 4632	130lbs
Grab Tensile Strength (Cross Direction)	ASTM D 4632	160lbs
Grab Elongation (Machine Direction)	ASTM D 4632	50%
Grab Elongation (Cross Direction)	ASTM D 4632	55%
CBR Burst	ASTM D 6241	450lbs
Cone Drop Test	EN 918	24mm
<b>Endurance Resistance</b>		
UV Resistance (% retained after 500hrs)	ASTM D 4355	70%
Chemical Resistance	EN 14030	80%
Oxidation Resistance	EN 13438	80%
<b>Hydraulic Properties</b>		
Apparent Opening Size	ASTM D 4751	70 US Std. Sieve
Permittivity	ASTM D 4491	1.30sec <sup>-1</sup>
Permeability	ASTM D 4491	0.24 cm/sec
Water Flow Rate	ASTM D 4491	100 gpm/ft <sup>2</sup>

Joining pins are supplied to join units together. Plastic ties are supplied to close the geotextile together at the top of unit ends. This prevents fill material from falling between unit joints.



The values given are indicative and correspond to average results obtained in our suppliers' laboratories and in testing institutes. The right is reserved to make changes without notice at any time.

EP/TSS/103/1.0/FEB09

HESCO Bastion USA 47152 Conrad E. Anderson Drive, Hammond, LA 70401  
Email: info@hesco-usa.com Web: www.hesco-usa.com

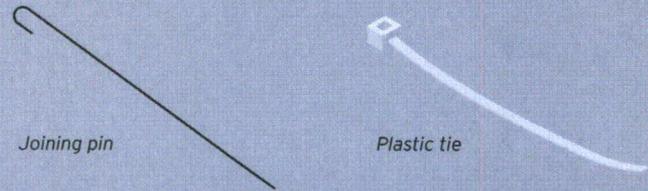
© Copyright 2009.  
International and US Patents apply. All Patents, Trademarks and Copyrights used under license.

A geotextile lined unit for use in flood protection applications. The design of these units reduces permeability of the wall when filled. Floodline units are designed for easy removal. Suitable for filling with earth, sand, or well graded gravel. Floodline units may also be used in other applications.

**General specifications**

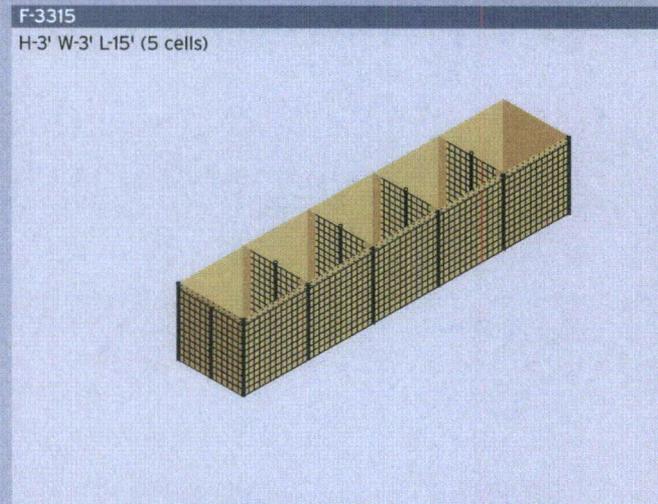
Geotextile lined welded wire fabric gabion to ASTM A 974-97. The geotextile is a heavy-duty, non-woven, permeable, polypropylene fabric, available in either green or sand color.

Joining pins are supplied to join units together. Plastic ties are supplied to close the geotextile together at the top of unit ends. This prevents fill material from falling between unit joints.

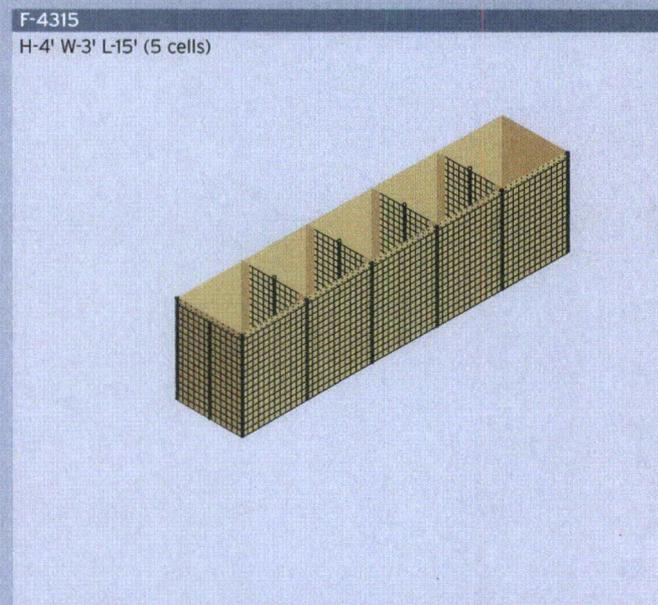


Welded wire mesh	
<b>Wire</b>	
Wire gauge	8.5 American SWG, steel
Wire diameter <sup>1</sup>	0.155"/3.937mm
Tensile strength of wire	80 - 110 ksi 550 - 760 kPa
Corrosion Protection	Zn-5Al-MM to ASTM A 856A/A 856M-03 minimum coating weight 0.8oz/ft <sup>2</sup> / 240g/m <sup>2</sup>
<b>Mesh</b>	
Wire spacing	3" x 3"
Tolerance on line wire spacing	+/- 1/8"
Cross wire straightness across test panel	limit of deviation 1/4" in 72"
Mesh strength	70% of wire tensile strength
<b>Panels</b>	
Squareness	in 4' diagonals shall not vary by more than 5/8"
Flatness	in 6' not more than 2" from plane

<sup>1</sup> Wire diameter is nominal



Geotextile	Standard	Value
<b>Mechanical Properties</b>		
Grab Tensile Strength (Machine Direction)	ASTM D 4632	130lbs
Grab Tensile Strength (Cross Direction)	ASTM D 4632	160lbs
Grab Elongation (Machine Direction)	ASTM D 4632	50%
Grab Elongation (Cross Direction)	ASTM D 4632	55%
CBR Burst	ASTM D 6241	450lbs
Cone Drop Test	EN 918	24mm
<b>Endurance Resistance</b>		
UV Resistance (% retained after 500hrs)	ASTM D 4355	70%
Chemical Resistance	EN 14030	80%
Oxidation Resistance	EN 13438	80%
<b>Hydraulic Properties</b>		
Apparent Opening Size	ASTM D 4751	70 US Std. Sieve
Permittivity	ASTM D 4491	1.30sec <sup>-1</sup>
Permeability	ASTM D 4491	0.24 cm/sec
Water Flow Rate	ASTM D 4491	100 gpm/ft <sup>2</sup>



The values given are indicative and correspond to average results obtained in our suppliers' laboratories and in testing institutes. The right is reserved to make changes without notice at any time.

# Rockface™ unit - RF-3315



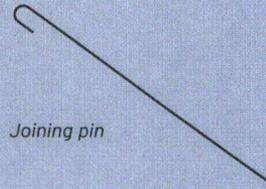
A geotextile lined unit with 1' wide unlined front section. The geotextile lined rear section allows the use of more economical fill such as earth, sand or gravel to be used.

**General specifications**

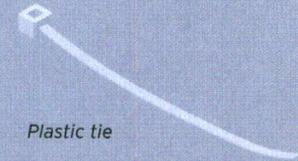
Geotextile lined welded wire fabric gabion with unlined front section to ASTM A 974-97. The geotextile is a heavy-duty, non-woven, permeable, polypropylene fabric, available in either green or sand color.

Lids and bases are supplied with all Rockface units. Lids and bases are pre-fitted to the units at the factory. Lacing wire and coils are supplied to close lids and bases on site.

Joining pins are supplied to join units together. Plastic ties are supplied to close the geotextile together at the top of unit ends. This prevents fill material from falling between unit joints.



Joining pin



Plastic tie

**Welded wire mesh**

**Wire**

Wire gauge	8.5 American SWG, steel
Wire diameter <sup>1</sup>	0.155"/3.937mm
Tensile strength of wire	80 - 110 ksi 550 - 760 kPa
Corrosion Protection	Zn-5Al-MM to ASTM A 856A/A 856M-03 minimum coating weight 0.8oz/ft <sup>2</sup> / 240g/m <sup>2</sup>

**Mesh**

Wire spacing	3" x 3"
Tolerance on line wire spacing	+/- 1/8"
Cross wire straightness across test panel	limit of deviation 1/4" in 72"
Mesh strength	70% of wire tensile strength

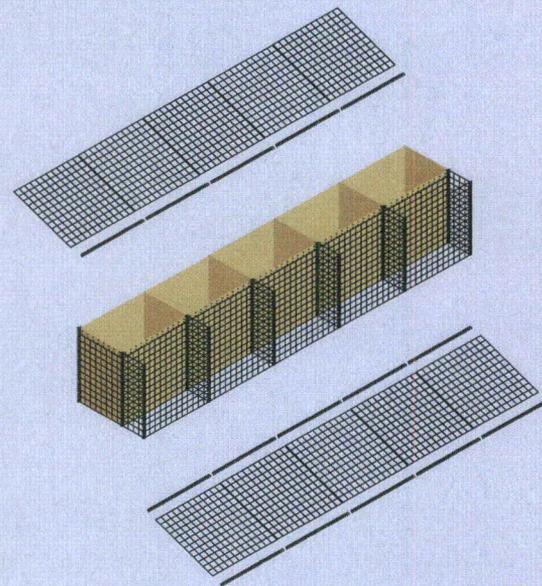
**Panels**

Squareness	in 4' diagonals shall not vary by more than 5/8"
Flatness	in 6' not more than 2" from plane

<sup>1</sup> Wire diameter is nominal

**RF-3315**

H-3' W-3' L-15' (5 cells)



Geotextile	Standard	Value
<b>Mechanical Properties</b>		
Grab Tensile Strength (Machine Direction)	ASTM D 4632	130lbs
Grab Tensile Strength (Cross Direction)	ASTM D 4632	160lbs
Grab Elongation (Machine Direction)	ASTM D 4632	50%
Grab Elongation (Cross Direction)	ASTM D 4632	55%
CBR Burst	ASTM D 6241	450lbs
Cone Drop Test	EN 918	24mm
<b>Endurance Resistance</b>		
UV Resistance (% retained after 500hrs)	ASTM D 4355	70%
Chemical Resistance	EN 14030	80%
Oxidation Resistance	EN 13438	80%
<b>Hydraulic Properties</b>		
Apparent Opening Size	ASTM D 4751	70 US Std. Sieve
Permittivity	ASTM D 4491	1.30sec <sup>-1</sup>
Permeability	ASTM D 4491	0.24 cm/sec
Water Flow Rate	ASTM D 4491	100 gpm/ft <sup>2</sup>

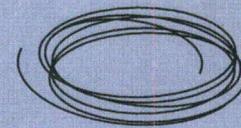
Coils are supplied to close all bases. 12" bracing ties are supplied for the rock fill insert. Lacing wire is supplied to close all lids and to join courses on site.



Coil



12" bracing tie



Lacing wire

The values given are indicative and correspond to average results obtained in our suppliers' laboratories and in testing institutes. The right is reserved to make changes without notice at any time.

# Rockbox™ units



Unlined Concertainer unit for general use as a welded wire fabric gabion.

**General specifications**

Welded wire fabric gabion to ASTM A 974-97.

Lids and bases are supplied with all Rockbox units. Lids and bases are pre-fitted to the units at the factory. Coils are supplied to close lids and bases on site.

Welded wire mesh	
<b>Wire</b>	
Wire gauge	8.5 American SWG, steel
Wire diameter <sup>1</sup>	0.155"/3.937mm
Tensile strength of wire	80 - 110 ksi 550 - 760 kPa
Corrosion Protection	Zn-5Al-MM to ASTM A 856A/A 856M-03 minimum coating weight 0.8oz/ft <sup>2</sup> / 240g/m <sup>2</sup>
<b>Mesh</b>	
Wire spacing	3" x 3"
Tolerance on line wire spacing	+/- 1/8"
Cross wire straightness across test panel	limit of deviation 1/4" in 72"
Mesh strength	70% of wire tensile strength
<b>Panels</b>	
Squareness	in 4' diagonals shall not vary by more than 5/8"
Flatness	in 6' not more than 2" from plane

<sup>1</sup> Wire diameter is nominal

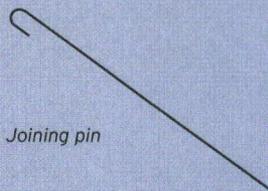
**2' high units**

**RB-2210** H-2' W-2' L-10' (5 cells)

**RB-224** H-2' W-2' L-4' (2 cell)      **RB-226** H-2' W-2' L-6' (3 cell)

**RB-228** H-2' W-2' L-8' (4 cell)

Joining pins are supplied to join units together.



Joining pin

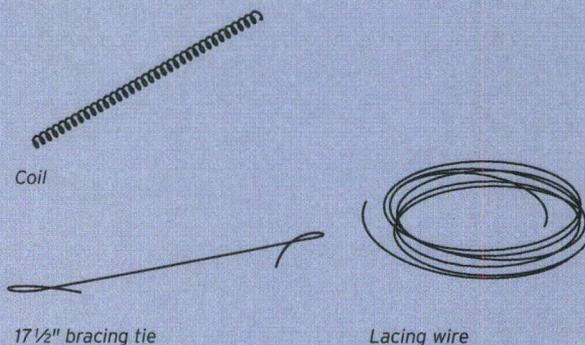
**3' high units**

**RB-3315** H-3' W-3' L-15' (5 cells)

**RB-336** H-3' W-3' L-6' (2 cell)      **RB-339** H-3' W-3' L-9' (3 cell)

**RB-3312** H-3' W-3' L-12' (4 cell)

Coils are supplied to close all lids and bases. 17 1/2" bracing ties are supplied. Lacing wire is supplied to join courses on site.



Coil

17 1/2" bracing tie

Lacing wire

The values given are indicative and correspond to average results obtained in our suppliers' laboratories and in testing institutes. The right is reserved to make changes without notice at any time.