



Energite® III

CRASH CUSHIONS

Product Description Assembly Manual



PN 627702

REVISION -B MARCH 2024

Energite® III

The Energite® III system has been tested pursuant to American Association of State Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH) specifications. The Energite® III system has been submitted for Federal-aid reimbursement eligibility on the National Highway System to the Federal Highway Administration (FHWA).

Product Manual



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WARNING: The local highway authority, distributors, owners, contractors, lessors, and lessees are RESPONSIBLE for the assembly, maintenance, and repair of the Energite® III system. Failure to fulfill these RESPONSIBILITIES with respect to the proper assembly, maintenance, and repair of the Energite® III system could result in serious injury and/or death.



These instructions are for standard assembly specified by the appropriate highway authority. In the event the specified system assembly, maintenance, or repair would require a deviation from standard assembly parameters, contact a Valtir representative.

This manual must be available to the worker(s) overseeing and/or assembling the product at all times. For additional copies, contact Valtir at (888) 323-6374 or visit www.Valtir.com.

The instructions contained in the manual supersede all previous information and manuals. All information, illustrations, and specifications in this manual are based on the latest Energite® III system information available to Valtir at the time of printing. Valtir reserves the right to make changes at any time. Please contact Valtir to confirm that you are referring to the most current instructions.

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Customer Service Contacts

Valtir is committed to the highest level of customer service. Feedback regarding the Energite® III system assembly procedures, supporting documentation, and performance is always welcome. Additional information can be obtained from the contacts below:

Valtir

Telephone:

(888) 323-6374

(214) 589-8140 (International)

Internet:

www.Valtir.com/contact

Abbreviations and Definitions

AASHTO American Association of State Highway and Transportation Officials

FHWA. Federal Highway Administration

MASH. Manual for Assessing Safety Hardware

MUTCD Manual on Uniform Traffic Control Devices

PPE Personal Protective Equipment

Safety Symbols

This section describes safety symbols that may appear in this product manual. Read this manual for complete safety, assembly, operating, maintenance, repair, and service information.



Indicates Danger or Warning. Failure to read and follow this warning could result in serious injury or death to the workers and/or bystanders.



Indicates Caution or High Importance. Failure to follow this warning can result in improper performance, failure of operation, to serious injury or death in the event of a vehicle impact with the system.



Indicates Notifications or Reference. These denote important items but will not cause system damage or serious injury.

Safety Rules for Assembly

This manual must be kept in a location where it is readily available to persons who are skilled and experienced in the proper assembly, maintenance, or repair of the Energite® III system. Additional copies of this manual are available from Valtir. Please contact Valtir if you have any questions concerning the information in this manual.



It is the responsibility of the installer to use proper safety precautions when operating power equipment and when moving heavy equipment or system components. Hand, eye, foot, and back protection is recommended.



Ensure that all of the Danger, Warning, Caution, and Important statements within this product manual are completely followed. Failure to follow this warning could result in serious injury or death in the event of a collision.

Important Introductory Notes

Proper assembly of the Energite® III is essential to achieve performance of the system under appropriate federal and state criteria. These instructions should be read in their entirety and understood before assembling the Energite® III. These instructions are to be used only in conjunction with the assembly of the Energite® III and are for standard assemblies only as specified by the applicable highway authority. In the event your system assembly requires or involves deviation from standard parameters or, during the assembly process a question arises, please contact the appropriate highway authority that specified this system at this particular location for guidance. Valtir is available for consultation with that agency. These instructions are intended for an individual who is qualified to both read and accurately interpret them as written. They are intended for the individual who is experienced and skilled in the assembly of highway products which are specified and selected by the highway authority.



DO NOT use any component part that has not been specified and/or approved for this system during assembly or repair.

Proper deployment and maintenance of the Energite® III is critical to achieve performance under appropriate state and federal guidelines. Take the time to review this manual including the Limitations and Warnings section thoroughly before performing the necessary work. Do not attempt to assemble Energite® III without the proper plans and this manual. Contact the Valtir Customer Service Department if you require additional information

Limitations and Warnings

Valtir contracts with FHWA approved testing facilities to perform crash tests, evaluation of tests, and submission of results to the FHWA for review.

The Energite® III system was tested to meet the impact criteria, requirements, and guidelines of MASH. These tests, specifically set forth by the FHWA, evaluate product performance defined by AASHTO involving lightweight cars (approx. 2420 lb. [1100 kg]) and full-size pickup trucks (approx. 5000 lb. [2270 kg]). A product can be certified for multiple test levels. This system is certified to the test level(s) shown below:

Test Level 3 (TL-3): 62 mph [100 km/h]



Arrays for different design speeds may be specified by your state or local engineer..

These FHWA directed tests are not intended to represent the performance of systems when impacted by every vehicle type or every impact condition existing on the roadway. This system is tested to the test matrix criteria of MASH as approved by FHWA.

Valtir expressly disclaims any warranty or liability from injury or damage to persons or property resulting from any impact, collision or harmful contact with products were assembled in consultation with Valtir or by third parties.

This system is intended to be assembled and maintained in accordance with specific state and federal guidelines. It is important for the highway authority specifying the use of a highway product to select the most appropriate product configuration for site specifications. The customer should be careful to properly select, assemble, and maintain the product. Careful evaluation of site layout, traffic speed/type, direction, and visibility are some of the elements that require evaluation by the highway authority in the selection of a highway product. For example, curbs could cause an untested effect on an impacting vehicle.

After an impact occurs, the debris from the impact should be removed from the area immediately and the specified highway product should be evaluated and restored to its original specified condition or replaced as the highway authority determines as soon as possible.



Do not assemble, maintain, or repair this system until you have read this manual thoroughly and completely understand it. Ensure that all Danger, Warning, Caution, and Important statements within the manual are completely followed. Please call Valtir at (888) 323-6374 if you do not understand these instructions or have questions.



Do not modify this system in any way.



It is the sole responsibility of the project engineer and/or local highway authority and its engineer to ensure that this system and delineation used meet all federal, state, specifying agency, and local specifications.



It is the sole responsibility of the project engineer and/or local highway authority and its engineer to ensure that the assembly meets all appropriate Manual on Uniform Traffic Control Devices (MUTCD) and local standards.

Technical Specifications

The Energite® III is a non-redirective, easy-to-assemble crash cushion consisting of a number of sand-filled modules that are assembled in a specific geometric array in front of a roadside feature.

Each module of the Energite® III system consists of a one-piece barrel, a Lid, and in some cases a cone insert. The cone insert is used to adjust the sand height or center-of-mass and the overall weight of the barrel. The barrel's weight requirement is determined by its place within the array.

The Energite® III modules are available in 90, 180, 320, 640 and 960 kg (200, 400, 700, 1400 and 2,100 lb.) sizes (Figures 1 and 2).

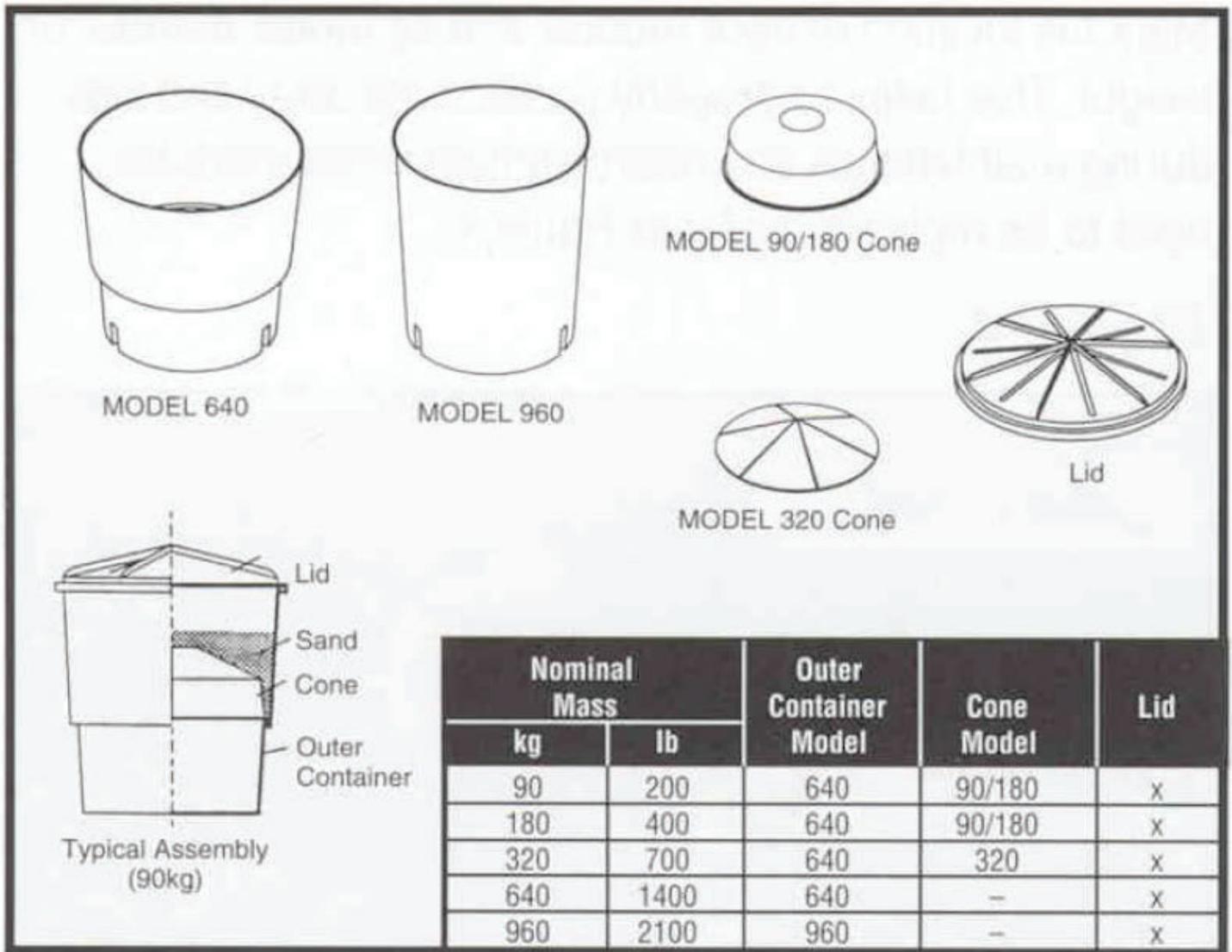


Figure 1

Energite® III Barrel Dimensions

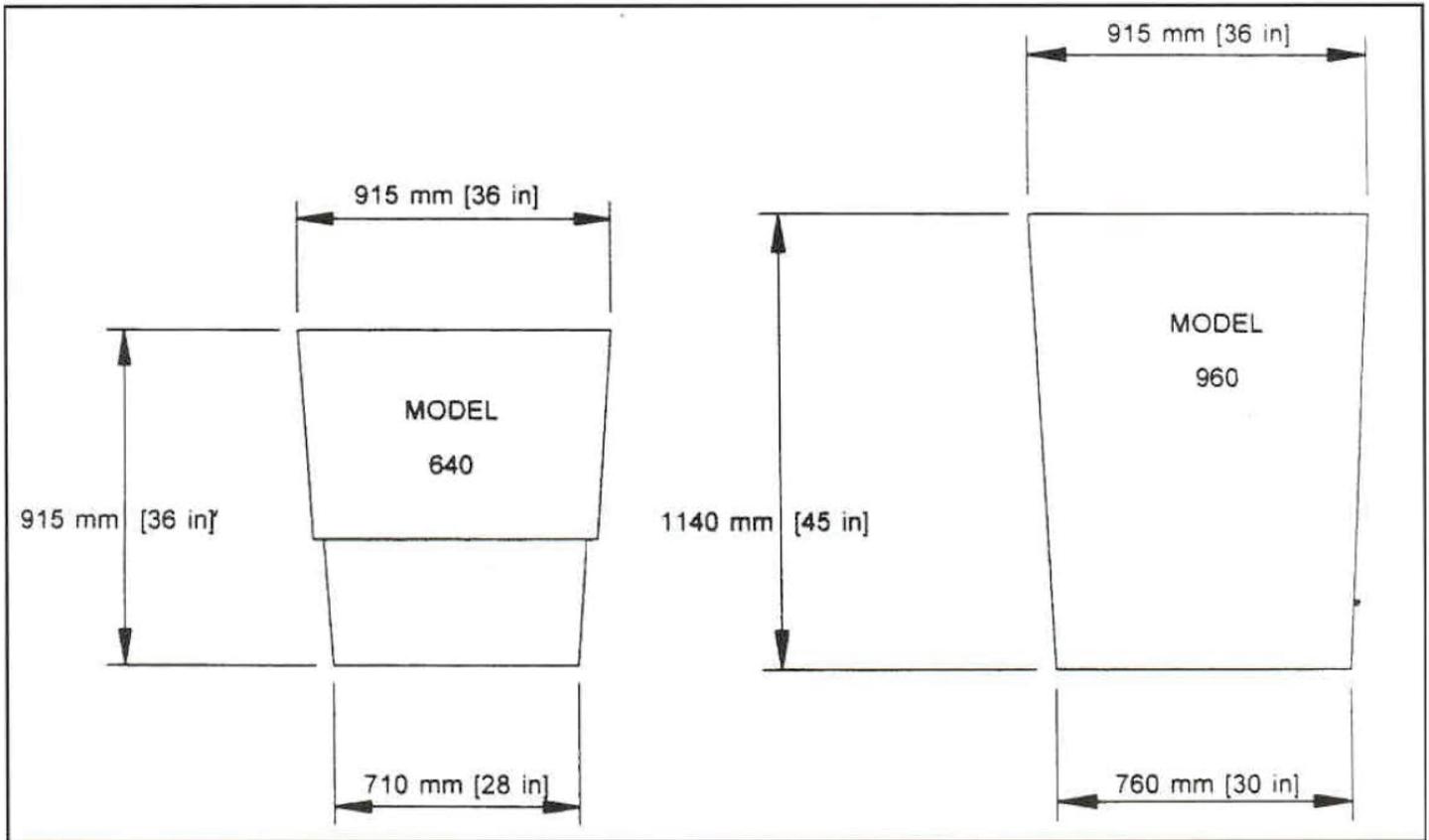


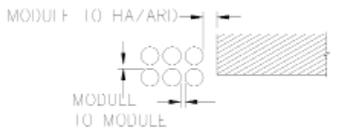
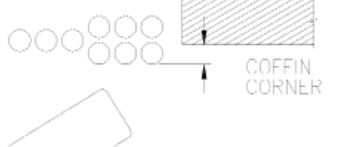
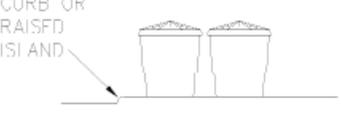
Figure 2



It is the responsibility of the installer to ensure the inertial barrier system and delineation used meet all federal, state, specifying agency, and local specifications. Failure to follow this warning could result in serious injury or death in the event of a collision.

Site Preparation

Before selecting inertial barriers as the attenuator for any given site, certain conditions of the site must be taken into consideration. See below for various condition recommendations.

Conditions	Valtir Recommendations	Example
1. Angle of array in relation to center line of obstacle	Not recommended for more than 10°	
2. Bidirectional traffic	Offset array to avoid impact to the rear module from wrong-way vehicles	
3. Module spacing: module to module and module hazard	Width: 6" [150 mm] max. Length: 6" [150 mm] min. To Hazard: 12" [305 mm] min.	
4. "Coffin" corner	Shield 30" [760 mm] outside of hazard	
5. Sloping sites (lateral and longitudinal)	5% grade maximum	
6. Curbs and raised islands or pallets for temporary sites	No more than 4" [100 mm] high	
7. Foundation pads	Flat surface; concrete or asphalt	
8. Maintenance	Keep site clear of debris and snow	
9. Sand densities	100 lbs/ft ³ [1600 kg/m ³]	
10. Vandalism	Check periodically for damage	



It is the sole responsibility of the project engineer and/or local highway authority and its engineer to ensure that the assembly meets all appropriate Manual on Uniform Traffic Control Devices (MUTCD) and local standards.

Special Side Considerations

Other special considerations warrant consideration in the configuration and assembly of inertial barrier systems. The following conditions and recommendations for treatment are based on performance.

1. Freezing Temperatures

In cold climates, sand (having a moisture content of 3% or more) should be mixed with 5% rock salt (by weight) to prevent the sand from freezing.

2. Modules on Structures

Two options are available when vibrations from moving traffic could cause modules to shift on structures.

- Steel or formed-in-place asphaltic concrete half-rings placed on the downhill side of the modules will prevent movement.
- Nails or bolts driven through the bottom of the outer module container into the roadway will also prevent movement.

3. Other Unique Conditions

You may find that there are other conditions unique to a particular site that must be considered to ensure a properly designed and functional inertial barrier system.

Standard Array

The following is the MASH tested 12 barrel TL-3 array for Energite® III (Figure 3). Arrays for different design speeds may be specified by your state or local engineer.

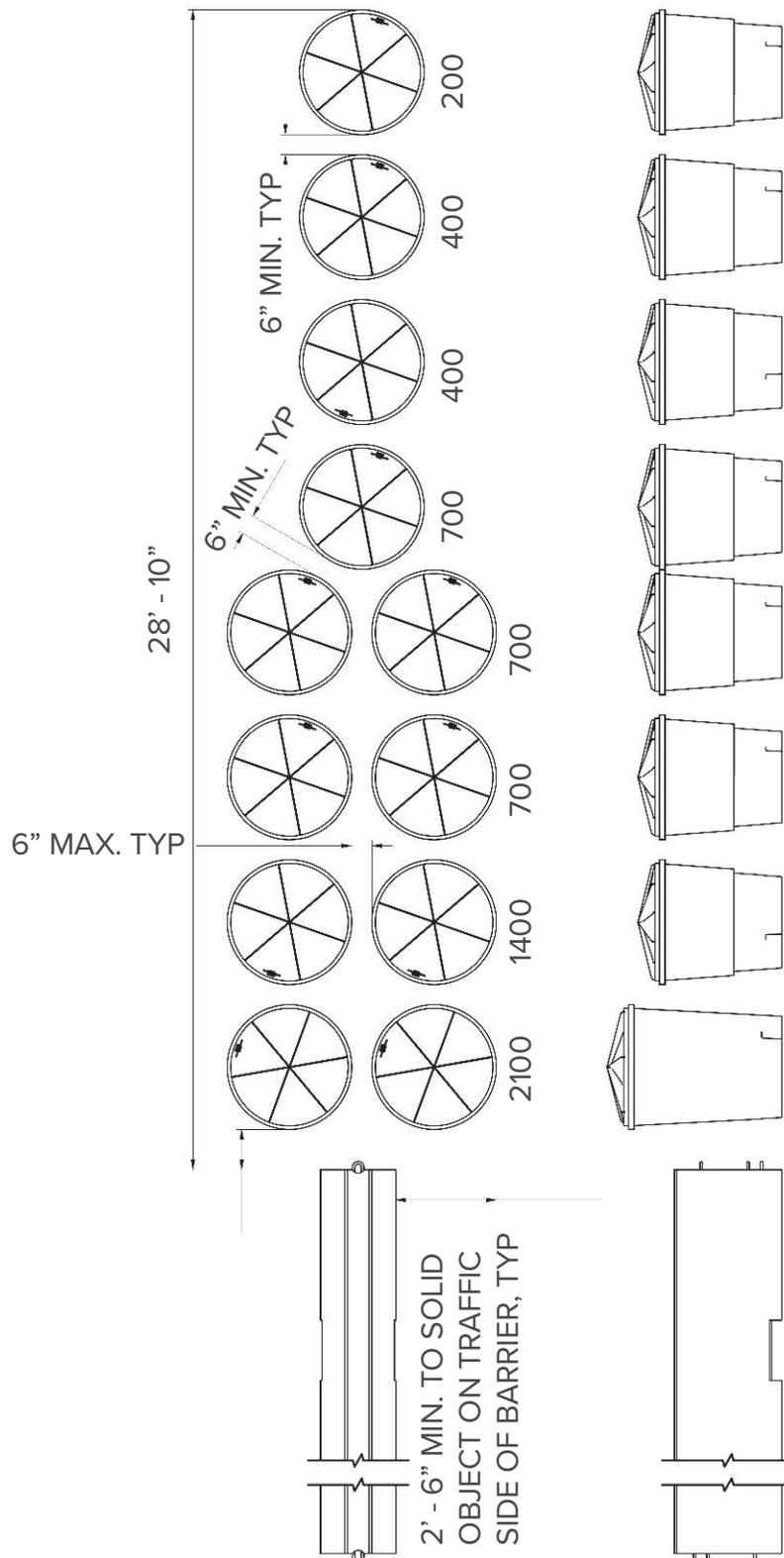


Figure 3 - Standard 12 Barrel TL-3 Array

Extra Capacity (Caltrans) Array

The following is the 14 barrel TL-3 array for Energite® III (Figure 3b). Arrays for different design speeds may be specified by your state or local engineer.

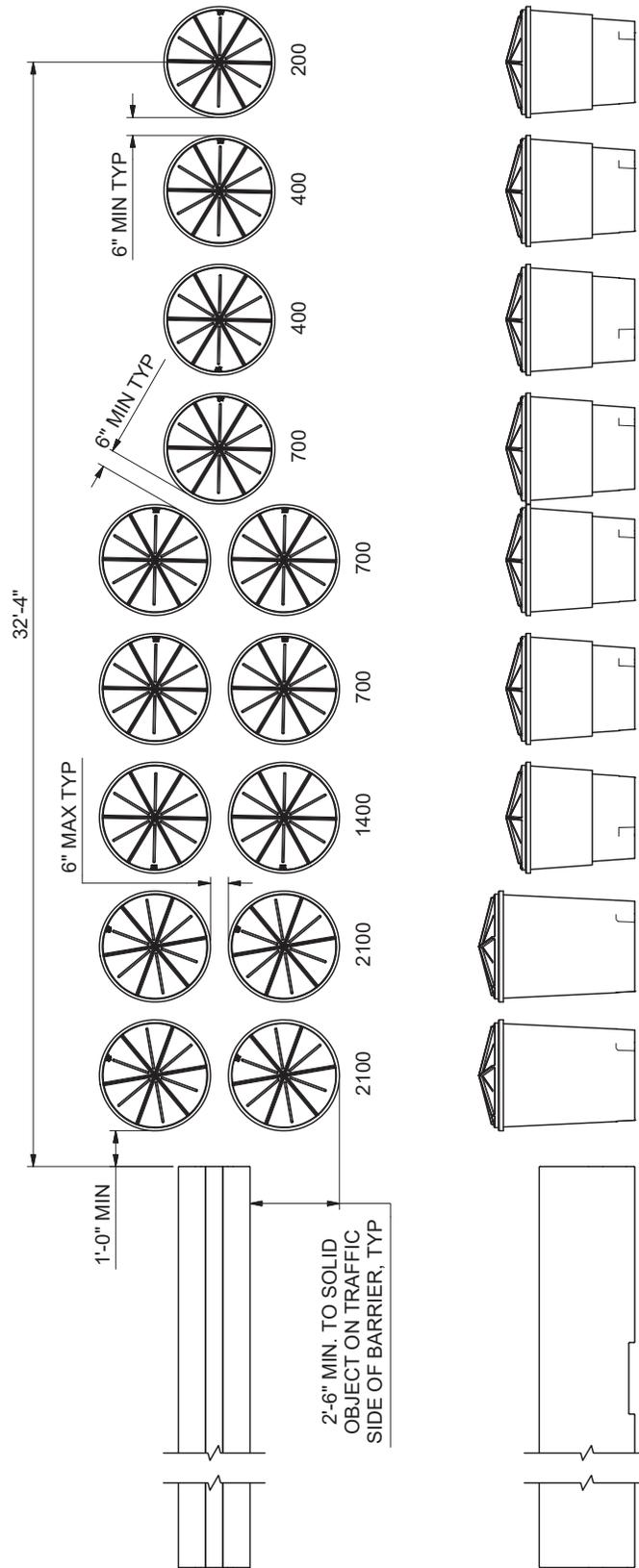


Figure 3b - Extra Capacity 14 Barrel TL-3 Array (Caltrans)

Inspect Shipment

It is the responsibility of the installer to check inventory of delivered parts against the shipping list supplied with the unit to ensure all parts have been received. In addition, verify that you have the array specifications provided by the manufacturer and responsible agency.

System Assembly



At the time of assembly, a number indicating the location for each model type should have been painted on the roadway surface. Assemble the array following the markings at the site.

1. Review Array Configuration/Specifications

Qualified engineer to direct array painted configuration and specification.

2. Deploy Traffic Control

Place traffic control to protect your crew and motorists.

3. Take Measurements

Take measurements to properly position the first row of barrels (closest to the roadside feature) according to specifications. These barrels must be laterally offset from the hazard by at least 30" (762 mm) and be positioned a minimum of 12" (305 mm) in front of the hazard (Figure 4).

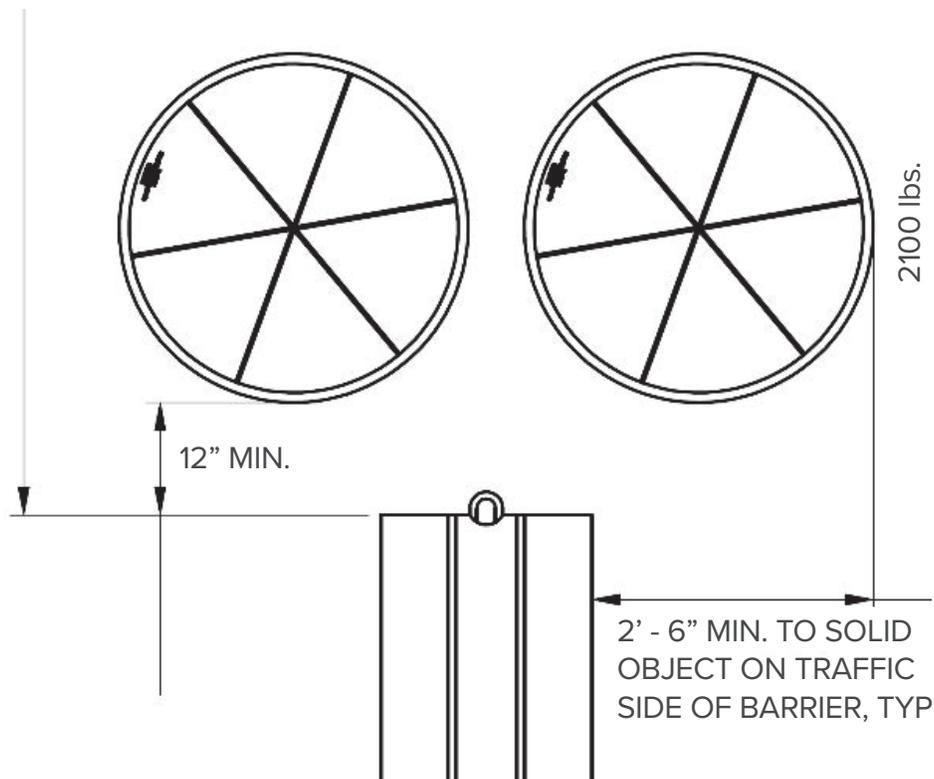


Figure 4

4. Position the Barrels

For barrels placed side by side, position them with 6" (152 mm) maximum of space between them (measured at the top of the barrel lid to lid). Position the barrels with 6" (152 mm) minimum between each barrel from back to front (measured lid to lid at the top of the barrel) according to the array (Figure 5).

When Energite® III modules are placed on slopes or vibrating surfaces, the modules may be held in place on concrete or asphalt:

- Concrete - two expansion bolts through holes, 180 degrees apart in the bottom.
- Asphalt - four galvanized nails driven through the bottom, 90 degrees apart, 3" (75 mm) from the outside wall of the barrel with full penetration.

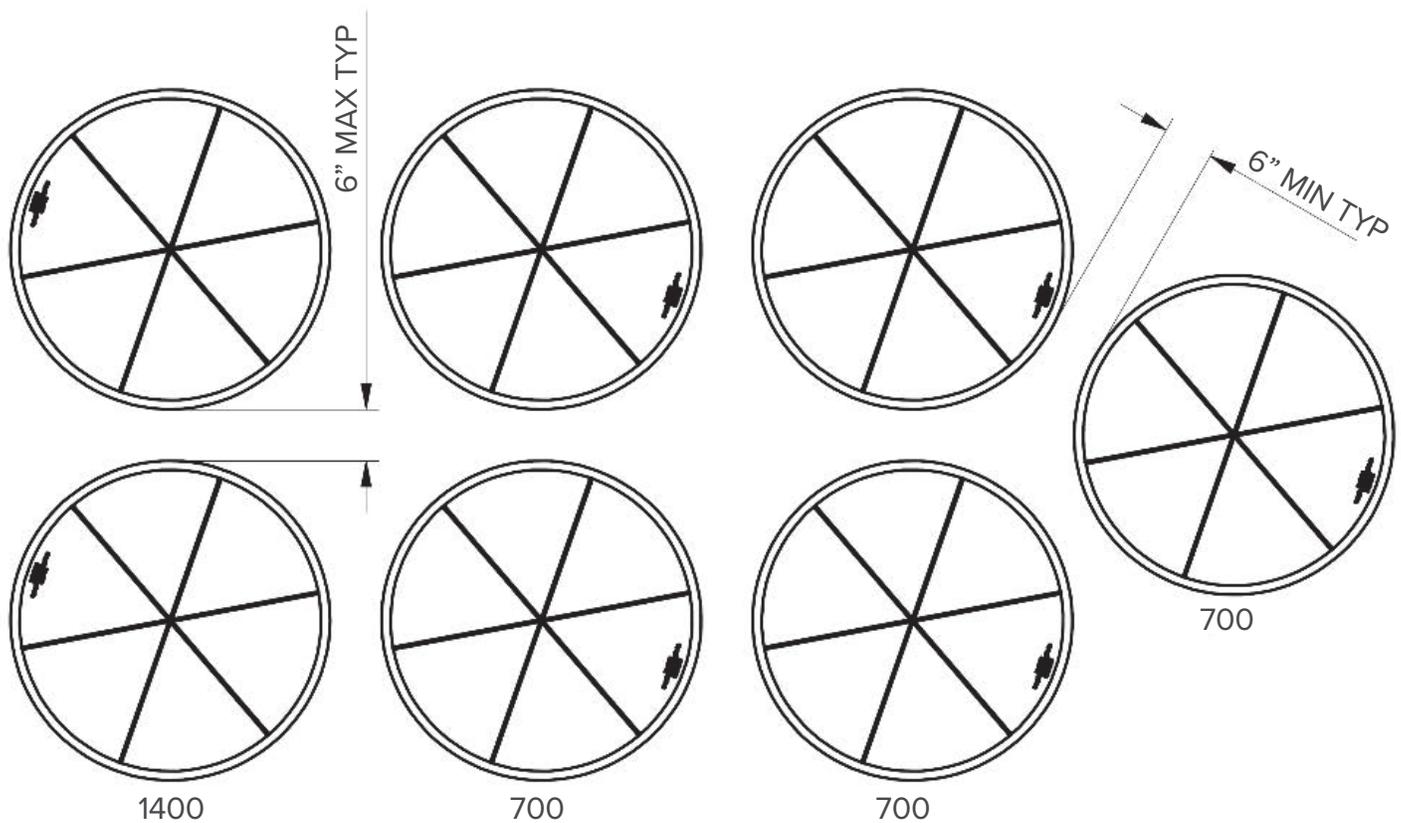


Figure 5

1. Placement of Inner Cones

2. Place the appropriate inner cones on the ledge inside the Barrel for the 200, 400 and 700 lb. (90, 180 and 320 kg) modules. (The 1400 – 2100 lb (640 - 960 kg) modules do not require a Cone insert.) Refer to page 6 (Figure 1) of this manual for a drawing and description of the module components.

5. Placement of Inner Cones

Place the appropriate inner cones on the ledge inside the Barrel for the 200, 400 and 700 lb. (90, 180 and 320 kg) modules. (The 1400 – 2100 lb (640 - 960 kg) modules do not require a Cone insert.) Refer to page 6 (Figure 1) of this manual for a drawing and description of the module components.

Note: The same Cone is used for the 200 and 400 lb. (90 and 180 kg) modules. Ensure all cones are in the proper position (Figure 6).

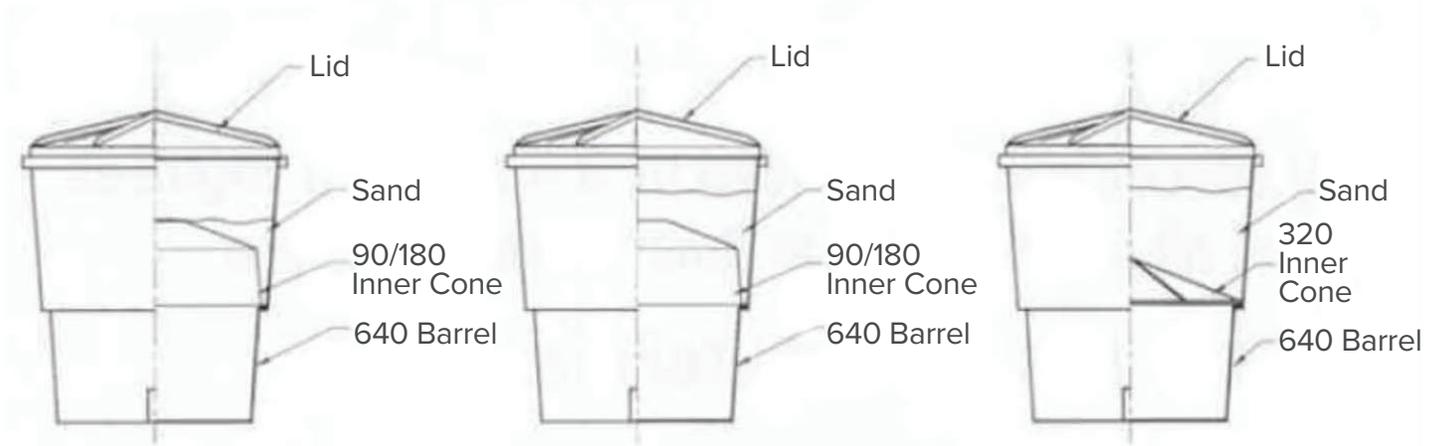


Figure 6

6. Filling the Barrels

Once the first row of modules (last row in array) is in place, they can be filled with the proper level of sand (Figure 8) using a sand-filled cement truck, skid steer, or front load tractor (Figure 5).



Figure 7

The sand must conform to ASTM C-33 (washed concrete sand or equal). The level is indicated on the decal located on the inside of the module. Fill heights marked on the decal are based on a sand density of 100 lbs/ft³ (1600 kg/m³).



During the filling process, it is very important that the modules are filled with the proper level of sand (Figure 8).



If the modules are located where freezing temperatures might occur, mix the sand with 5% rock salt by weight to prevent the sand from freezing. Be sure the salt is evenly dispersed in the sand.

7. Lid Placement

Snap Lids firmly into place to prevent water and debris from affecting system performance.

Alternate Assembly Option

1. The Energite® III barrels feature a convenient one-piece design with a solid bottom. This allows the modules to be fully assembled and filled at a remote site and then transported to the deployment site. The fully-assembled modules can be lifted on and off the truck using a crane and lifting device.
2. Barrels can be placed on 4" (100 mm) maximum height pallets for temporary assembly.



Placing Energite® III barrels on pallets is an untested condition that is not covered under FHWA eligibility but is allowable in Roadside Design Guide applications for systems placed on curbs.

960 kg FILL TO TOP
(MODEL 960 ONLY)

2100 lbs. FILL TO TOP
(MODEL 960 ONLY)

FILL HEIGHTS

FILL HEIGHTS

NOTICE

TO FUNCTION PROPERLY DURING AN IMPACT THIS MODULE MUST BE USED WITH THE PROPER CONE INSERT IF APPLICABLE AND FILLED TO THE PROPER LEVEL WITH SAND CONFORMING TO ASTM C-33. (WASHED CONCRETE SAND OR EQUAL).

FILL HEIGHTS SHOWN ARE BASED ON A DENSITY OF 1600 kg/m³ [100 pcf]. FOR OTHER DENSITIES ADJUST THE FILL HEIGHT ACCORDINGLY. REFER TO THE ENERGITE III SYSTEM MANUAL FOR MORE INFORMATION.
CAUTION

- 640 kg. -

- 1400 lbs. -

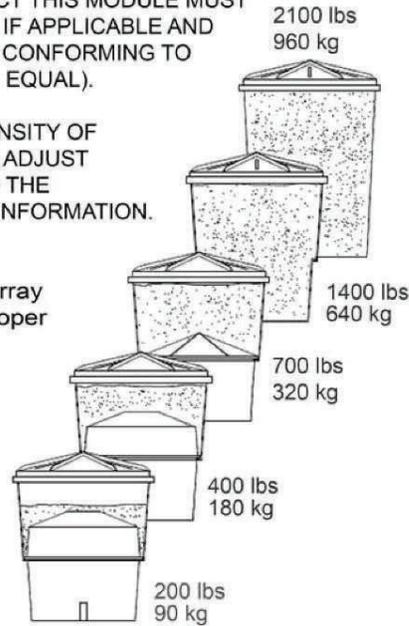
- 320 kg. -

- 700 lbs. -

- 180 kg. -

- 400 lbs. -

1. Sand module should be placed in an array designed by a qualified engineer. Improper placement could result in excessive G levels for errant vehicles and possible injuries to occupants.
2. In cold climates add 5% (by weight) rock salt, evenly dispersed, to prevent the sand from freezing.
3. Lids should be snapped in place around entire circumference.
4. When placed on slopes or vibrating surfaces the module may be held in place on:
 - Concrete by two bolts through holes, 180° apart, in the bottom.
 - Asphalt by four galvanized nails driven through the bottom, 90° apart, 75mm [3"] from the outside wall, full penetration.
5. Sand arrays DO NOT have redirecting capability for side angle impacts. Sites where cars could penetrate to the rigid hazard should be protected with an alternate type of crash cushion with side re-direct capability.



Energite® III
Energy Absorption Systems, Inc. d.b.a.



Decal No. 114908

_ 90 kg. _

_ 200 lbs. _

Figure 8

Assembly Checklist

Performed by: _____

Date: _____

Location: _____

- Verify that the system has been assembled according to the array specifications provided by the qualified engineer. Be sure all modules are in their proper locations.
- Verify all lids are securely fastened and not missing or ajar.
- Remove any debris around the system that could cause ramping.

Inspection

It is important to inspect the systems often and according to traffic patterns as an impact can occur at any time.

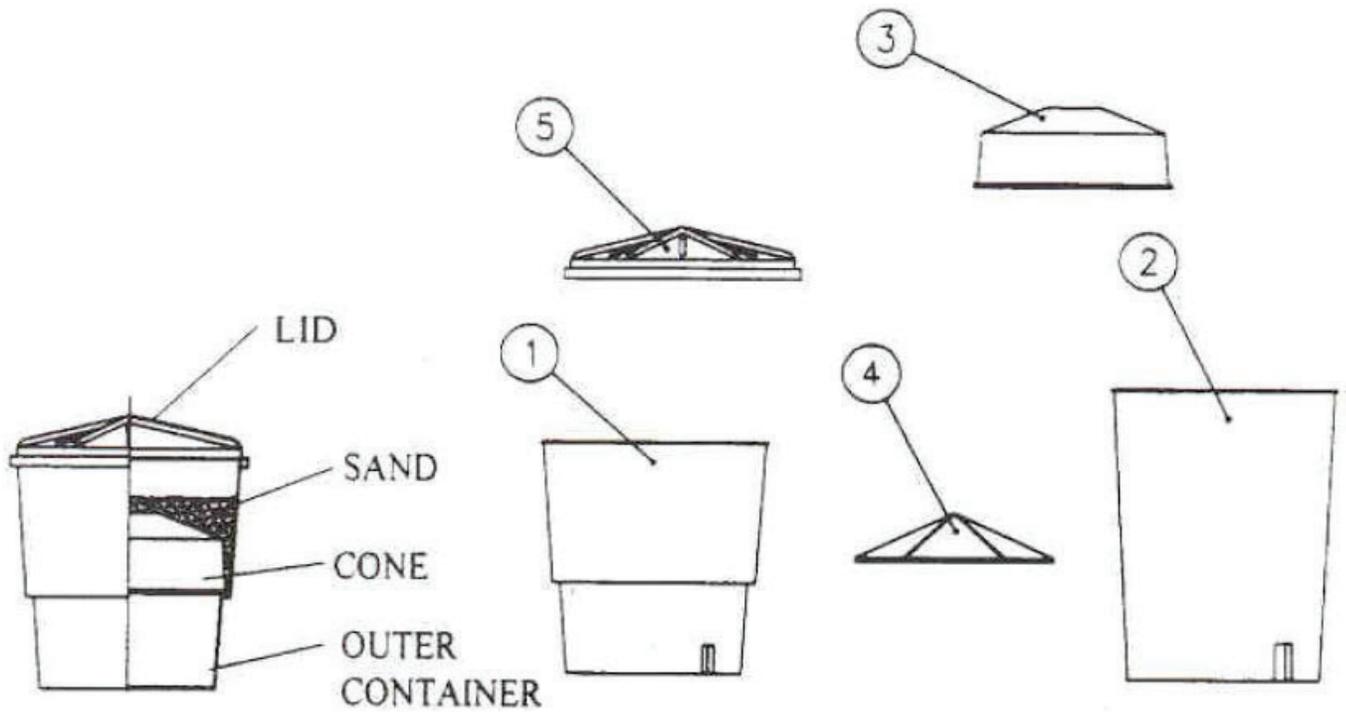
Visual Drive-By Inspection

Drive-by inspections are recommended as needed based upon volume of traffic and frequency of impact data. If any of the following conditions are noticed, a walk-up inspection is required. Repair compromised systems as soon as possible.

- Check to see if the modules show visible damage.
- Check to see if any lids are missing or ajar.
- Check for debris around the modules.
- Check to see if any objects are on top of the modules.
- Record the location, condition, and date of the visual drive-by inspection in your maintenance log.

Walk-Up Inspection

- Make sure all lids are snapped firmly in place.
- Make sure the lids are not inverted or collapsed inwards.
- Make sure each module is not tilted or leaning.
- Make sure the modules are not cracked and the outer shells are undamaged.
- Make sure all modules are in their proper location.



ITEM	PART NO.	DESCRIPTION
1	2731191-0100	Energite® III, 640(1400), Outer Container
2	2731261-0100	Energite® III, 960(2100), Outer Container
3	2731201-0000	Energite® III, 90/180(200/400), Inner Cone
4	2731271-0000	Energite® III, 320(700), Inner Cone
5	2731241-0000	Energite® III, Lid, Black

Figure 9

ITEM	PART NO	DESCRIPTION
1	114904	1400 lbs. (640 kg) Outer Container
2	114906	2100 lbs. (960 kg) Outer Container
3	114905	200/400 lbs. (90/180 kg) Inner Cone
4	114903	700 lbs. (320 kg) Inner Cone
5	114907	Lid, Black



Use only Valtir parts that are specified for assembling, maintaining, or repairing the Energite® III. Do not utilize or otherwise comingle parts from other systems even if those systems are other Valtir systems. Such configurations have not been tested, nor have they been accepted for use. Assembly, maintenance, or repairs using unspecified parts or accessories is strictly prohibited. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with an UNACCEPTED system.

Refurbishment



The Energite® III may be a total loss on impact.

1. Setup Traffic Control

Set up traffic control to protect your crew as designated by the local authority.

2. Remove Debris

Remove sand and debris from the site. This sand may be used later for filling the replacement barrels, but it must first be cleared of all debris.

3. Position Barrels

Place the first row (closest to the roadside feature) of new barrels on the existing roadway surface markings that indicate original barrel location.



At the time of assembly, a number indicating the location for each model type should have been painted on the roadway surface. Assemble the array following the markings at the site.

4. Barrel Placement on Concrete/Asphalt Slopes or Vibrating Surfaces

Concrete - Use two (2) bolts through holes, 180 degrees apart in the bottom.

Asphalt - Use four (4) galvanized nails driven through the bottom 90 degrees apart, 3" (75 mm) from the outside wall of the barrel with full penetration.

5. Placement of Inner Cones

Place the appropriate inner cones on the ledge inside the replacement barrels for the 200, 400 and 700 lb. (90, 180 and 320 kg) modules. (The 640 and 960 kg modules do not require a cone insert.) The same Cone is used for the 200 and 400 lb. (90 and 180 kg) modules.

6. Filling of Sand

Once the first row of modules is in place, they can be filled with the proper level of sand. (An efficient method of quickly filling the modules is to use a sand filled cement mixer.)

The sand must conform to ASTM C-33 (washed concrete sand or equal). The level is indicated on the decal located on the inside of the module. Fill heights marked on the decal are based on a sand density of 100 lbs/ft³ [1600 kg/m³].



If the modules are located where freezing temperatures might occur, mix the sand with 5% rock salt by weight to prevent the sand from freezing. The rock salt should be evenly dispersed throughout the sand.

7. Snap Lids Closed

Snap all lids firmly into place until each module is secure.

8. Clean Up

Remove any debris from site.

Alternate Refurbishment Option

The Energite® III barrels feature a convenient, one-piece design with a solid bottom. This allows replacement modules to be fully assembled and filled before transport and placement. Pre-assembled modules can be lifted on and off the truck using a crane or lifting device.



For more complete information on Valtir products and services, visit us on the web at www.valtir.com. Materials and specifications are subject to change without notice. Please contact Valtir to confirm that you are referring to the most current instructions.

WWW.VALTIR.COM
1.888.323.6374