



N-E-A-T[®]
CRASH CUSHION
ASSEMBLY MANUAL

N-E-A-T®

Assembly Manual



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Suite 525
Addison, Texas 75001



Important: These instructions are to be used only in conjunction with the assembly, maintenance, and repair of the N-E-A-T® system. These instructions are for standard assembly specified by the appropriate highway authority only. In the event the specified system assembly, maintenance, or repair would require a deviation from standard assembly parameters, contact the appropriate highway authority engineer. This system has been accepted by the Federal Highway Administration for use on the national highway system under strict criteria utilized by that agency. Valtir representatives are available for consultation if required.

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

The instructions contained in this Manual supersede all previous information and Manuals. All information, illustrations, and specifications in this Manual are based on the latest N-E-A-T® system information available to Valtir at the time of printing. We reserve 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 N-E-A-T® system, its assembly procedures, supporting documentation, and performance is always welcome. Additional information can be obtained from the contact information below:

Valtir:

Telephone:	(888) 323-6374 (USA Only) (214) 589-8140 (USA or International)
Contact Link:	www.Valtir.com/Contact
Internet:	www.Valtir.com

Important Introductory Notes

Proper assembly of the N-E-A-T® system 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 N-E-A-T® system. These instructions are to be used only in conjunction with the assembly of the N-E-A-T® system 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.

A set of product and project shop drawings will be supplied by Valtir. The shop drawings will be for each section of the assembly. These drawings should be reviewed and studied thoroughly by a qualified individual who is skilled in interpreting them before the start of any assembly.



Important: Read safety instructions thoroughly and follow the assembly directions and suggested safe practices before assembling, maintaining, or repairing the N-E-A-T[®] system. Failure to follow this warning can result in serious injury or death to workers and/or bystanders. It further compromises the acceptance of this system by the FHWA. Please keep these instructions for later use.



Warning: Ensure that all of the N-E-A-T[®] system Warnings, Cautions, and Important statements within the N-E-A-T[®] Manual are completely followed. Failure to follow this warning could result in serious injury or death in the event of a collision.

Recommended Safety Rules for Assembly

*** Important Safety Instructions ***

This Manual must be kept in a location where it is readily available to persons who are skilled and experienced in the assembly, maintenance, or repair of the N-E-A-T[®] system. Additional copies of this Manual are immediately available from Valtir by calling (888) 323-6374 or visiting Valtir.com. This Manual may also be downloaded directly from the website indicated below. Please contact Valtir if you have any questions concerning the information in this Manual or about the N-E-A-T[®] system.

Always use appropriate safety precautions when operating power equipment, mixing chemicals, and when moving heavy equipment or the N-E-A-T[®] components. Gloves, apron, safety goggles, steel toe boots, and back protection shall be used.

Safety measures incorporating traffic control devices specified by the highway authority must be used to provide safety for personnel while at the assembly, maintenance, or repair site.

Safety Symbols

This section describes the safety symbols that appear in this N-E-A-T® Manual. Read the Manual for complete safety, assembly, operating, maintenance, repair, and service information.

<u>Symbol</u>	<u>Meaning</u>
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Safety Alert Symbol: Indicates Danger, Warning, or Caution. Failure to read and follow the Danger, Warning, Safety, or Caution indicators could result in serious injury or death to the workers and/or bystanders.

Warnings and Cautions

Read all instructions before assembling, maintaining, or repairing the N-E-A-T® system.



Warning: Do not assemble, maintain, or repair the N-E-A-T® system until you have read this Manual thoroughly and completely understand it. Ensure that all Warnings, Cautions, and Important statements within the Manual are completely followed. Please call Valtir at (888) 323-6374 if you do not understand these instructions. Failure to follow this warning could result in serious injury or death in the event of a collision.



Warning: Safety measures incorporating appropriate traffic control devices specified by the highway authority must be used to protect all personnel while at the assembly, maintenance, or repair site. Failure to follow this warning could result in serious injury or death in the event of a collision.



Warning: Use only Valtir parts that are specified herein for the N-E-A-T® for assembling, maintaining, or repairing the N-E-A-T® system. Do not utilize or otherwise commingle parts from other systems even if the 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.



Warning: Do NOT modify the N-E-A-T® system in any way. Failure to follow this warning could result in serious injury or death in the event of a collision.



Warning: Ensure that the N-E-A-T® 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.



Warning: Ensure that your assembly meets all appropriate Manual on Uniform Traffic Control Devices (MUTCD) and local standards. Failure to follow this warning could result in serious injury or death in the event of a collision.

Limitations and Warnings

Valtir, in compliance with the National Cooperative Research Highway Program 350 (NCHRP Report 350) “Recommended Procedures for the Safety Performance of Highway Safety Features”, contracts with FHWA approved testing facilities to perform crash tests, evaluation of tests, and submittal of results to the Federal Highway Administration for review.

The N-E-A-T® system has been tested and successfully evaluated per the NCHRP 350 guidelines for Test Level 1 (TL-1) and Test Level 2 (TL-2) non-redirective crash cushions.

Test Level 2: 70 km/h [44 mph]

The FHWA directed test is 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 only to the test matrix criteria of NCHRP 350 as approved by FHWA.

Valtir does not represent nor warrant that the results of these controlled tests show that vehicle impacts with the products in other conditions would necessarily avoid injury to person(s) or property. Impacts that exceed criteria capabilities of the product may not result in acceptable impact performance as outlined in NCHRP Report 350, relative to structural adequacy, occupant risk, and vehicle trajectory. Valtir expressly disclaims any warranty or liability for injury or damage to persons or property resulting from any impact, collision, or harmful contact with products, other vehicles, or nearby hazards or objects by any vehicle, object or person, whether or not the products were assembled by or under the direction of Valtir or by third parties.

The N-E-A-T® system is intended to be assembled, delineated, and maintained in accordance with specific state and federal guidelines. It is important to select the most appropriate product configuration for a site. The customer should be careful to properly select, assemble, and maintain the product. Careful evaluation of the site geometry, vehicle population type, speed, traffic direction, and visibility are some of the elements that require evaluation in the proper selection of a safety appurtenance. For example, curbs could cause an untested effect on an impacting vehicle.

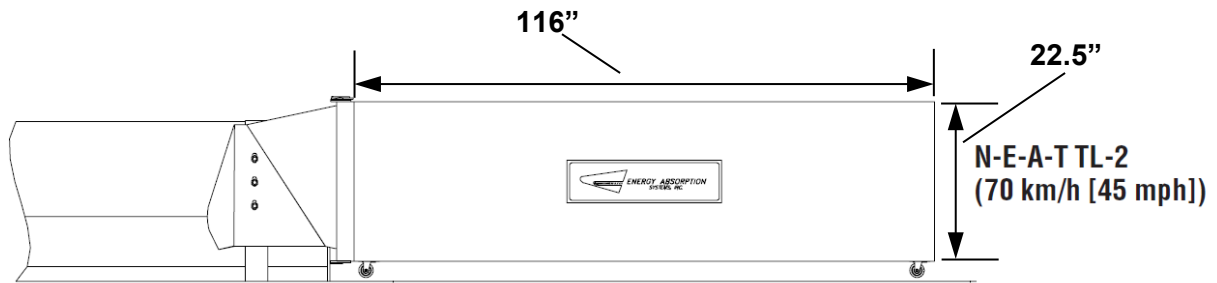


Figure 1

Recommended Tools

For PCMB Application

- 1/2" ratchet wrench with 5" extension
- 1/2" drive sockets: 9/16", 3/4", 1 1/8"
- 5/16" Allen Wrench
- (2) 3/4" open end or box end wrenches
- (2) 2m [6'] long steel pry bars
- 10 mm [3/8"] thick piece of steel shim roughly 100 mm x 300 mm [4" x 12"], or larger.
- 1/2" torque wrench (27 to 270 N-m [20 to 200 ft-lb])
- Large block of wood or several smaller blocks roughly totaling 250 mm x 250 mm x 250 mm [10" x 10" x 10"]
- Measuring tape
- 3 lb. sledge hammer
- Gloves

Note: The above list of tools is a general recommendation. Depending on specific site conditions and the complexity of the assembly specified by the appropriate highway authority, additional or fewer tools may be required. Decisions as to what tools are needed to perform the job are entirely within the discretion of the specifying highway authority and the authority's selected contractor performing the assembly of the system at the authority's specified site.

Site Preparation/Foundation

The N-E-A-T[®] system should be mounted to a fully cured 27.6 MPa (4000psi) concrete PCMB (New Jersey Type) barrier with approximate dimensions of 610 mm (24") wide by 810 mm (32") high. The N-E-A-T[®] system may be positioned over concrete, asphalt or soil surface conditions having a cross slope of less than 8% and varying less than 2% over the system length.

Inspect Shipment

Before Assembling the N-E-A-T[®] system, check the received parts against the shipping list supplied with the system. Make sure all parts have been received.

Assembly

Note: The drawing package supplied with the N-E-A-T® system must be used with these instructions for proper assembly and should take precedence over these general instructions.

Unpacking

Care should be taken to avoid damaging the sides of the N-E-A-T® Cartridge when removing the shipping container and completing the system assembly. As soon as possible, place the N-E-A-T® Cartridge onto its swivel wheels to facilitate handling. To minimize risk of injury to yourself or the Cartridge, avoid sitting on or placing tools onto the Cartridge. Should any touch-up painting be required, use “Highway Safety Yellow” colored paint. If any problems are encountered, we encourage you to contact our Customer Service Department at (888) 323-6374.

How to Determine Left/Right and Front/Rear

To determine left from right when assembling the N-E-A-T® system or when ordering parts, stand facing the hazard to be protected. Your left is the system’s left and your right is the system’s right. The front of the fully assembled system will be nearest you and the rear of the system will be attached to the hazard.

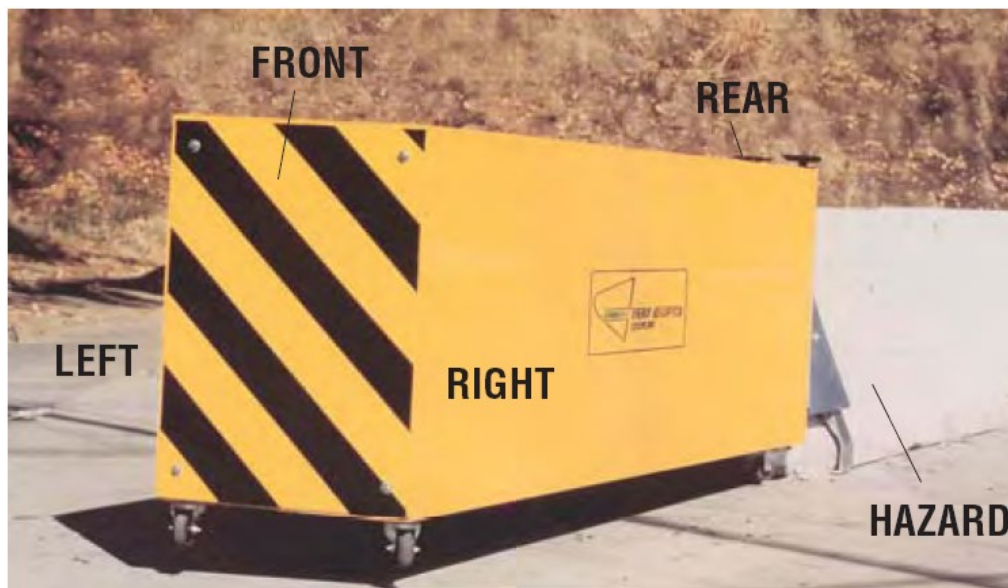


Figure 2

Assembly Procedures for PCMB Applications

For Standard New Jersey pin and loop PCMB, Valtir has developed a quick and easy method of attaching the N-E-A-T® Cartridge utilizing simple hand tools only.

Assembly Summary

The PCMB is first lifted, and then shimmed so that the Lower Support Strap can be slipped under the end and bolted into place. Next, the Cartridge Support Structure is placed onto the end of the PCMB and tightened down. The N-E-A-T® Cartridge is then rolled and pinned into place and the shim is removed. Then the left and right transition panels are bolted into place.

Step 1: Lifting the PCMB (See Figure 3)



Warning: Be careful when placing the shim under the PCMB. Your fingers and/or hands can be severely injured!

Begin the PCMB assembly by lifting the end of the PCMB section. This can be accomplished by using a large block of wood and a 2 m [6'] long pry bar. Valtir has found that placing the block of wood near the bottom loop of the PCMB and utilizing it as a fulcrum and then placing one end of the pry bar under the bottom loop of the PCMB, one person can lift the end of a 3 m [10'] long section of PCMB.

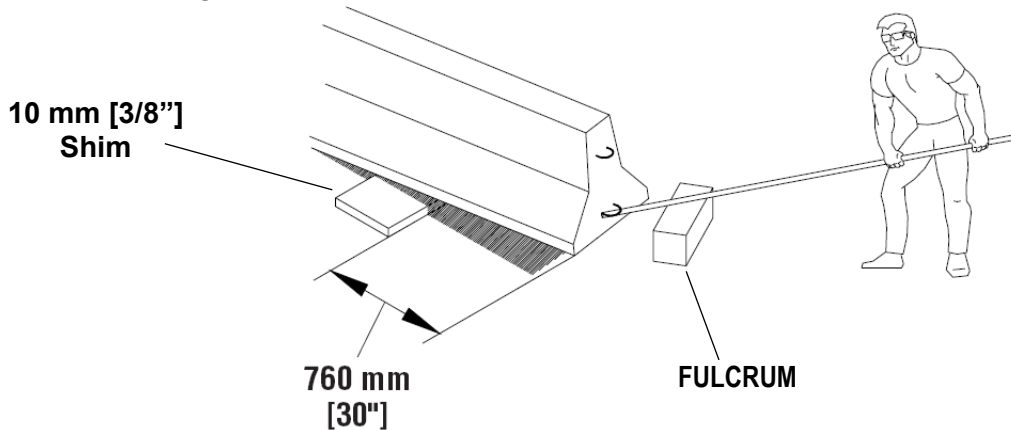


Figure 3
Lifting the PCMB

Step 2: Assembling the Support Strap (See Figure 4)

Slide the Lower Support Strap so that its edge is about 305 mm [12\"] back from the end of the PCMB. Next, straddle the Upper Support Strap over the PCMB and align with the Lower Support Strap. Insert the 3/4\" diameter bolts starting with the Upper Strap through to the Lower Strap and place the nuts on the end of the bolts. **HAND-TIGHTEN ONLY!**

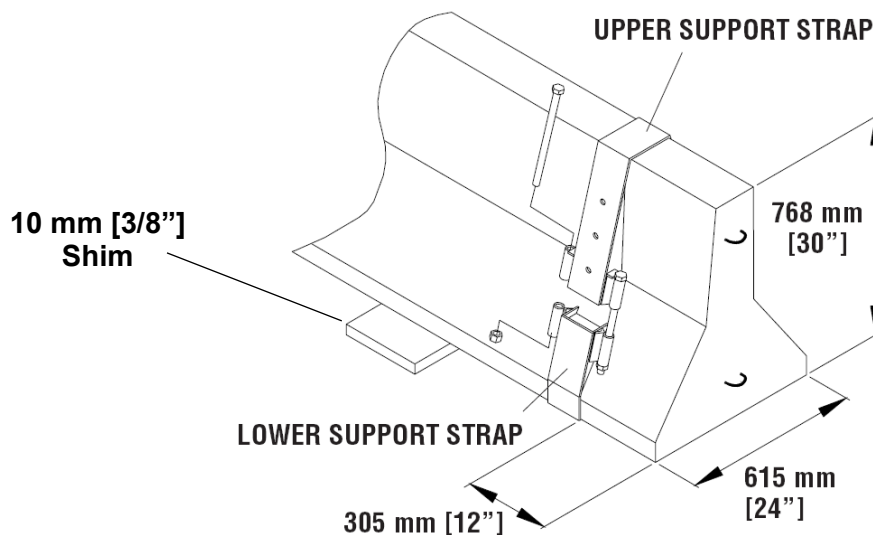


Figure 4
Support Strap Assembly

Step 3: Support Structure (See Figure 5)

- A. Position the Support Frame so that the shorter tubes are on top. Place the flat side (that is the side opposite the tubes) onto the end of the PCMB so that the PCMB's loops protrude through the slots.
- B. Place a Backup Attachment Bracket over each of the two protruding loops of the PCMB so that the bracket nests into the slot of the support Frame and the bracket's flanges face outward. The bottom of the Support Frame should be flush with the bottom of the CMB.
- C. Insert the Wedges through the Backup Attachment Brackets and into the loops, one from the top and one from the bottom (See Figure 3). Place a nut on top end of the 762 mm (30") long threaded 1/2" diameter rod and insert it through the Upper and Lower Wedges. Place nut on bottom of threaded rod so that rod does not protrude past bottom of CMB. Align the bottom of the Support Frame with the bottom and centered left to right on the PCMB section. Torque to 80 N-m [60 ft-lb]. As the nuts on the rod are tightened the wedges will "pull" the Backup Attachment Bracket tight against the face of the PCMB. If this does not occur, correct the problem before proceeding. If input is needed, please contact our Customer Service Department (See Page 3).

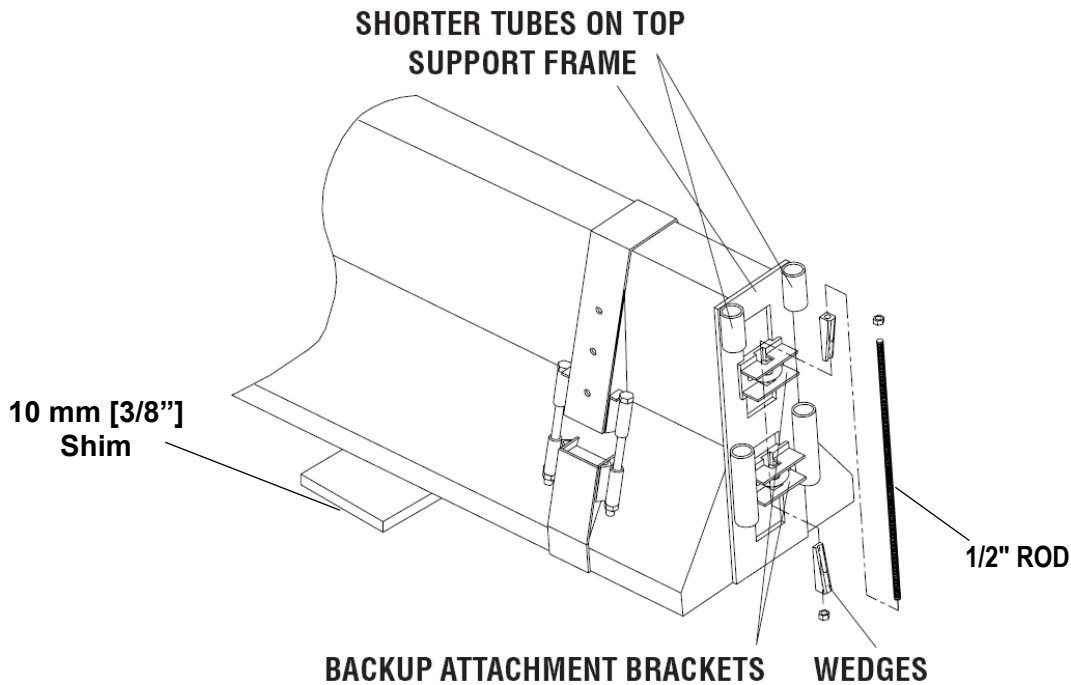


Figure 5

Step 4: Backup Attachment (See Figure 6)

The backup is attached to the rear of the N-E-A-T® Cartridge. It is attached so the tubes are on the side away from the Cartridge and the flange with the cutout is at the bottom. There are three sets of mounting holes on the Backup. Choose the set of holes so that the bottom edge of the Cartridge will be 100 mm [4"] off the ground. In the majority of cases, the middle set of holes will result in proper Cartridge height. Place the Backup onto the rear end of the N-E-A-T® Cartridge, and fasten the eight 1/2" nuts with their flat washers and lock washers into place. Torque the eight 1/2" nuts to 122 N-m [90 ft-lb].

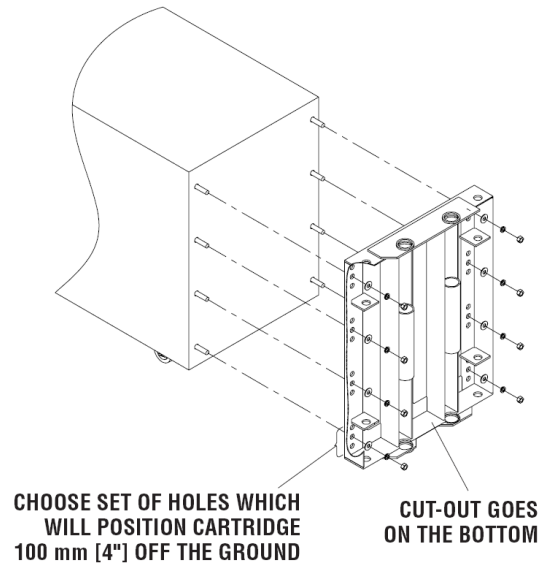


Figure 6

Step 5: Cartridge/Backup to Support Structure Attachment (See Figure 7)

Roll the Cartridge with the attached Backup against the Support Frame until the tubes on the Backup nest with the tubes on the Support Frame. It may be necessary to lift the rear end of the Cartridge so that the tubes can nest. Place the two large 38 mm [1 1/2"] diameter by 900 mm [35"] long pins into the two sets of nested tubes to hold the Cartridge into place. To get the pins to fall into place, it may be necessary to align the tubes on the Backup and Support Frame. This can be easily done by carefully lifting the front end of the N-E-A-T® Cartridge with a pry bar. (Be careful not to damage the Cartridge by using a piece of scrap lumber to protect the Cartridge.)



Warning: To avoid straining your back, use the pry bar to lift the end of the Cartridge!

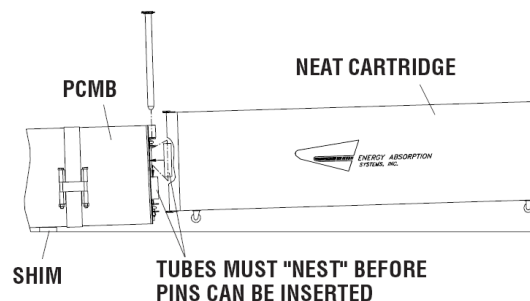


Figure 7

Step 6: Transition Panel Assembly (See Figure 8)

The Transition Panels can now be assembled. Take one of the panels and place it up against the PCMB so that the holes in the forward tabs nest with the holes on the tab on the N-E-A-T® Cartridge Backup. When the holes are aligned, insert the 900 mm [35"] long by 25 mm [1"] diameter pins which will hold the panel into place. Repeat this step on the opposite side.

Insert the three 1/2" X 1 1/4" long Allen head socket bolts with their 1/2" x 1 3/8" washers into the holes on the Transition Panels but do not tighten. It may be necessary to move the Strap Assembly forward or rearward to align the holes on the Strap assembly. Once all the bolts are in place, they should be torqued to 81 N-m [60 ft-lb] with the 5/16" Allen wrench.

Now tighten the four 3/4" bolts that hold the Support Straps together. They can be accessed from below using the 1 1/8" socket and the 6" extension, torque the nuts to 122 N-m [90 ft-lb].

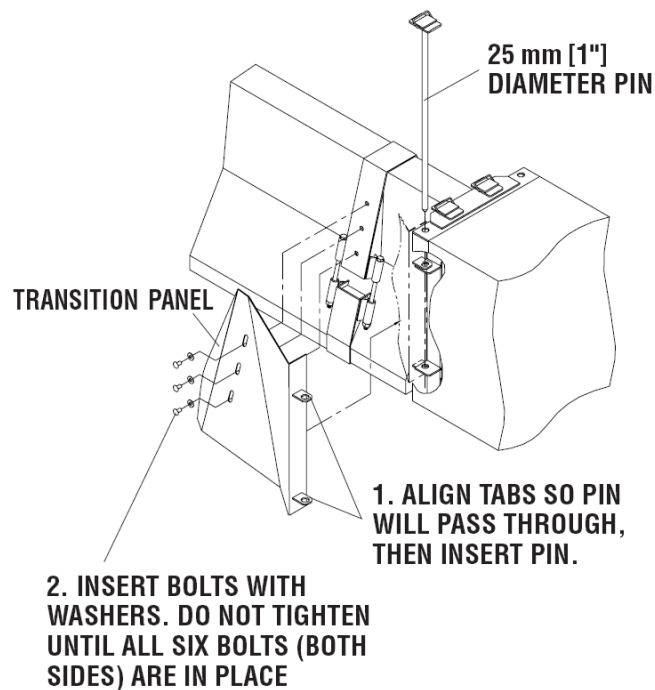


Figure 8

Step 7: Chevron Selection (See Figure 9)

The N-E-A-T[®] Cartridge comes with unidirectional, left-hand, or right-hand bidirectional chevron markings.

Remove the four 3/8" bolts on the front of the Cartridge using the 9/16" socket, and depending upon Cartridge placement; use whichever chevron markings suit your application. Refer to MUTCD or state traffic control plan or other applicable regulations of the highway authority to determine the type of reflectivity required. Tighten the 3/8" bolts to 20 N-m [15 ft-lb].

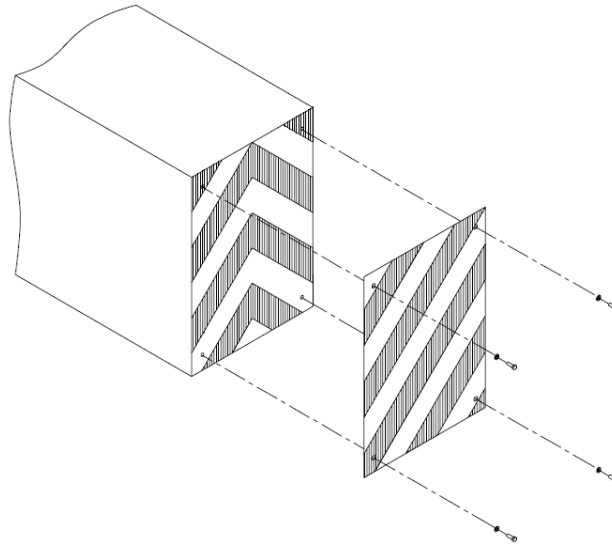


Figure 9

Step 8: Checking Assembly Height (See Figure 10)

Now it is possible to remove the 10 mm [3/8"] thick shim from under the PCMB. This can be done by using the pry bar and the block of wood, this time lifting from under the Backup Frame.



Caution: Do not use the pry bar on the Cartridge itself. Severe damage to the Cartridge will result.

With the PCMB resting directly on the ground, measure how high the bottom of the Cartridge is from the grade. It should be 100 mm [4"] off the ground, and not vary by more than 25 mm [1"] over the length of the Cartridge.

If height adjustments are necessary, the following changes can be made:

One of the remaining two hole patterns on the Backup can be used to raise or lower the Cartridge. The hole patterns are 38 mm [1 1/2"] apart. This adjustment method requires unpinning the Cartridge from the Support Frame, removing the eight nuts from the Backup, and repositioning up or down as necessary.

It is also possible to raise or lower the Support Frame. This requires unpinning the Cartridge from the Support Frame and rolling it out of the way, loosening a Wedge Tension Nut, and then raising the Support Frame to the desired height before tightening the tension nut.

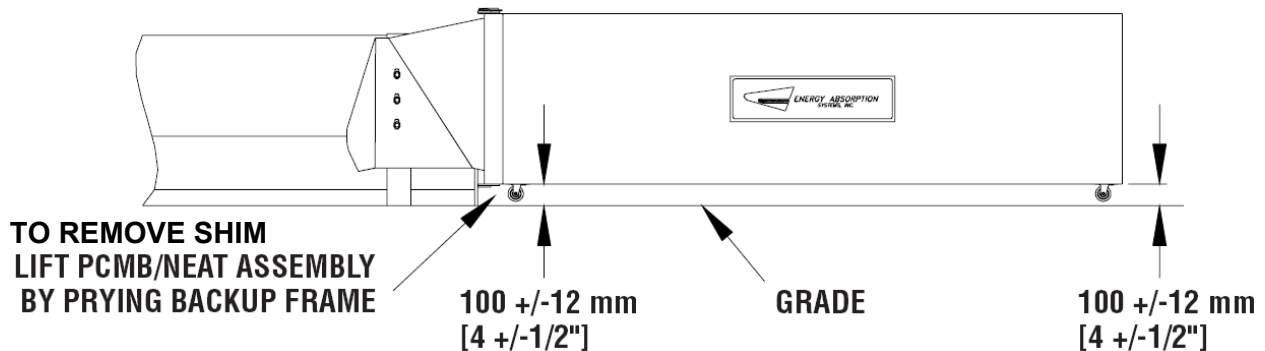


Figure 10

Moving the PCMB to another site

If you need to move the PCMB, first unpin the N-E-A-T® Cartridge and Transition Panels from the PCMB and roll the N-E-A-T® Cartridge out of the way. Now, either the PCMB is moved to its new location or Support Frame is mounted on the PCMB at the new site. Either way, the N-E-A-T® Cartridge is rolled into place and then re-pinned. (A second Support Structure may be favorable.)

N-E-A-T® Nose Assembly

Step 1 Place nose onto Cartridge as shown

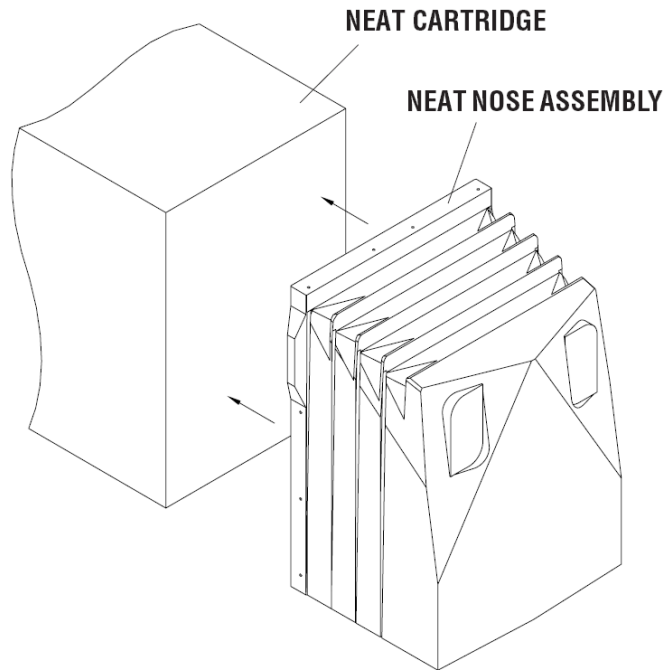


Figure 11

Step 2 Match drill 1/8" diameter holes (10 places) using Nose as a template.

Step 3 Drive screws (P.N. 116893G) through Nose and into Cartridge as shown in 10 places.

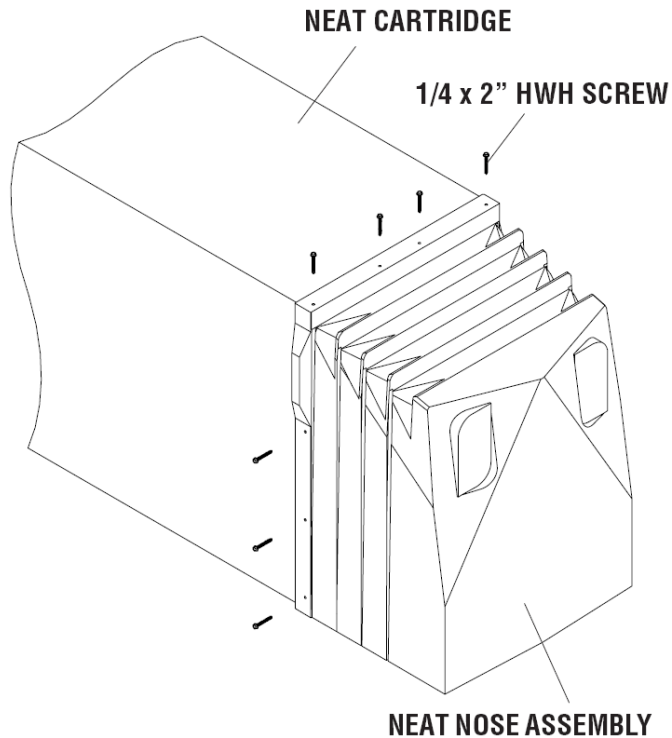


Figure 12

Maintenance and Repair

A slow drive-by visual inspection of the N-E-A-T® system is often all that is required. If the drive-by inspection indicates that maintenance is required, a walk-up inspection is necessary. Important items to check are listed below:

1. Has the system been hit? The N-E-A-T® Cartridge is disposable and cannot be repaired. Even a minor hit resulting in a light buckling of the nose section will reduce the capacity of the system to absorb energy in the event of a full design impact. Always replace a damaged Cartridge with a new one.
2. Is the Cartridge too high or too low? Proper alignment of the Cartridge is four inches off the ground in both the front and rear. This is critical for the Cartridge to function properly by preventing an untested effect or nose diving.
3. Are any of the pins missing? Missing or damaged pins must be replaced if the Cartridge is to function properly during impact.
4. Are Reflective Panels worn or faded? If so, check compliance with the reflective standards of the appropriate highway authority and replace as needed.

Reference Drawings

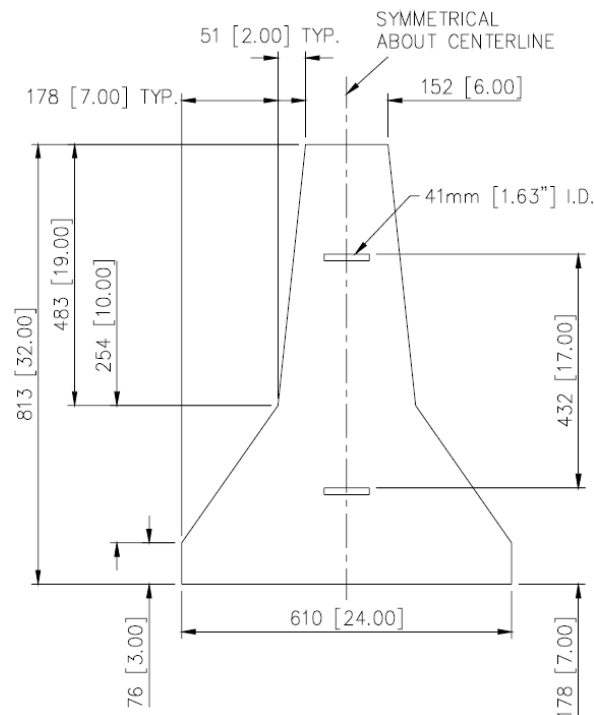
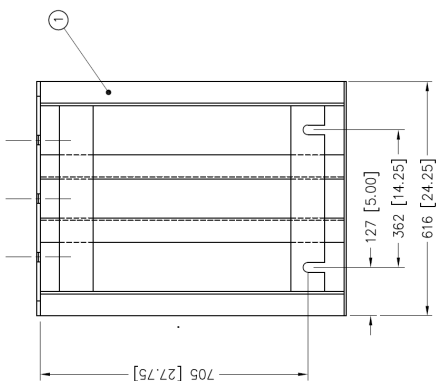
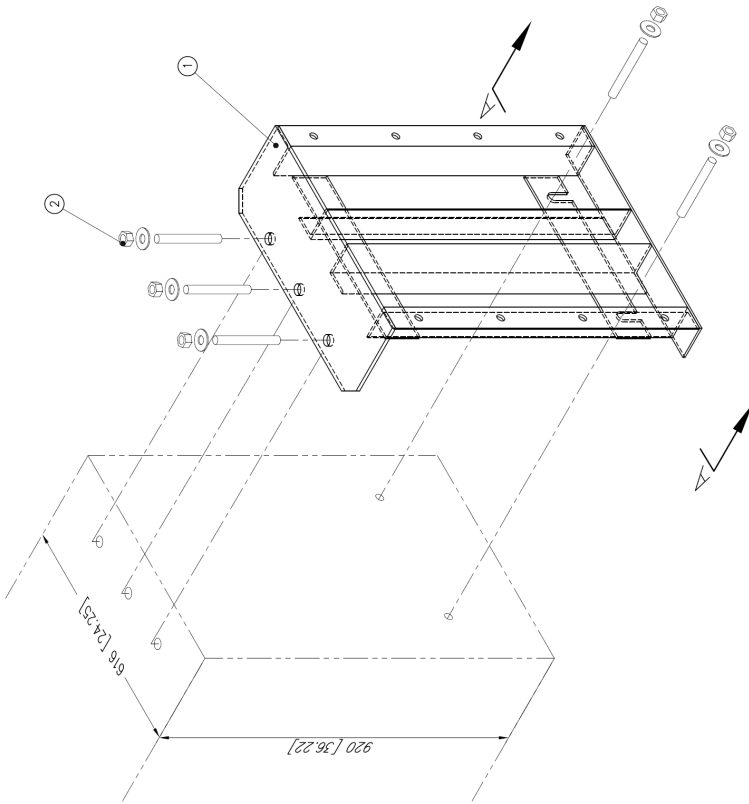


Figure 13
PORTABLE CONCRETE
MERIDIAN BARRIER (PCMB)*

***UNITS OF MEASURE ARE IN MILLIMETERS [INCHES] UNLESS OTHERWISE NOTED.**

PARTS LIST		REC'D	
ITEM	STOCK NO.	DESCRIPTION	
1	2777231-0000	BACKUP, CONCRETE, NEAT	1.00
2	3525130-0000	ANCHOR, MP-3, PINT KIT, 3/4X6 1/2, HDR	1.00



NOTES:
USE BACKUP AS TEMPLATE TO
LOCATE & DRILL HOLES.

Revisions	Date	Rev	By	Chk	App	DESIGN SPEED	M.P.H.
WALL WAS 920mm HIGH	10/06	A	SC	STT	SPT	AVERAGE G's	
EST. FORCE ON BACKUP STRUCTURE							KIPS
Designed							DATE
Drawn							10/05/05
Checked							10/20/05
Approved							10/20/05
NEXT ASSEMBLY							35-77-13

REFERENCES	
Project No.	_____ Sales Order No. _____
Serial No.	_____ Color _____

0	100	200	300	400	mm	
0	3	6	9	12	15	IN
SCALE						
UNITS OF MEASUREMENT ARE MILLIMETERS [INCHES] UNLESS OTHERWISE NOTED.						

ASSEMBLY NO.	3577140-0000
N-E-A-T™ SYSTEM	
VERTICAL CONCRETE BARRIER WALL	
BACKUP SUPPORT STRUCTURE	
SCALE	(1:8)
SIZE	C
DWG. NUMBER	35-77-14
SHEET	A
REV.	A

N-E-A-T® System Vertical Concrete Barrier Wall Backup Support Structure

DWG 3577140-0000

Notes:



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