

Aluminum TMA

(Truck Mounted Attenuator)

Cartridge Patching Guide

Part No. 618145B

Rev. D August 2011



**Trinity Highway Products
International**

Aluminum TMA Cartridge

(Truck Mounted Attenuator)

Patching Guide



**2525 Stemmons Freeway
Dallas, Texas 75207**

**This Guide must be available to the worker at all times. For additional copies, contact
Energy Absorption Systems at (800) 323-6374**

The instructions contained in this Guide supersede all previous information and guides. All information, illustrations, and specifications in this Guide are based on the latest Cartridge repair information available to Energy Absorption Systems at the time of printing. We reserve the right to make changes at any time.

Table of Contents

Table of Contents.....	2
Customer Service Contacts	3
Important Introductory Notes.....	3
Recommended Safety Rules	4
Safety Symbols	4
Warnings and Cautions.....	5
Required Tools and Supplies	6
Patching Procedure.....	6

Customer Service Contacts

Energy Absorption Systems (a Trinity Industries, Inc. company) is committed to the highest level of customer service. Feedback regarding the TMA Patching Guide, its procedures and supporting documentation is always welcome. Our goal is to assist the highway authority in their efforts to make their highways safer. Additional information, if needed, can be obtained by calling the telephone numbers below:

Energy Absorption Systems:

Telephone:	(888) 323-6374 (U.S. Calls) (312) 467-6750 (Domestic or International)
Fax:	(312) 467-1356
E-mail:	customerservice@energyabsorption.com
Internet: Energy Absorption Systems Trinity Highway Products, LLC. Trinity Industries, Inc.	http://www.energyabsorption.com/ http://www.highwayguardrail.com/ http://www.trin.net/

Important Introductory Notes

The purpose of these instructions is to provide assistance to highway authority approved contractors when they are patching a Truck Mounted Attenuator (TMA) aluminum cartridge box per that authority's specifications.

These procedures are being provided for those rare instances when a highway authority chooses to patch a TMA and not replace the system. It is anticipated that the highway authority will only patch a system when some minor repair is needed and the authority, in consultation with its engineers, has determined that the TMA is still capable of performing at the level accepted by the FHWA. If the system cannot perform to that acceptance criteria, **PATCHING SHOULD NOT BE DONE**. For more information refer to the "Extending Life and Durability" literature available from Energy Absorption Systems.

Proper repair of the aluminum structure is essential to provide the best performance potential. Take time to review these instructions thoroughly before performing the work. The repair kit, available from Energy Absorption Systems, supplies hard- to-find items, or those best suited for the tasks.

If you need additional information, or have questions about the Cartridge, please call: Energy Absorption Systems' Customer Service Department at 1-888-323-6374.

Recommended Safety Rules




* Important Safety Instructions *

This Manual must be kept in a location where it is readily available to persons who repair the Energy Absorption Systems Aluminum Cartridge. Additional copies of this Guide are available from Energy Absorption Systems by calling (888) 323-6374.

Please contact Energy Absorption Systems if you have any questions concerning the information in this Guide or about repairing the Energy Absorption Systems Aluminum Cartridge.


Always use appropriate safety precautions when operating power equipment and when moving heavy equipment or the Energy Absorption Systems Aluminum Cartridge components. Gloves, safety goggles, and back protection should be used.

Safety measures incorporating traffic control devices must be used to provide safety for personnel while at the installation, maintenance, or repair site.

	Important: These instructions are to be used only in conjunction with the maintenance and repair of the Energy Absorption Systems Aluminum Cartridge. In the event any cartridge repair requires or involves special circumstances not covered in this guide, contact an Energy Absorption Systems representative for consultation.
	Important: Read safety instructions thoroughly and follow the suggested safe practices before repairing the Energy Absorption Systems Aluminum Cartridge. Failure to follow this warning can result in serious injury or death to the worker and/or bystanders. Please keep these instructions for later use.
	Warning: Ensure that all Energy Absorption Systems Aluminum Cartridge Warnings, Cautions, and Important statements within this manual are completely followed. Failure to follow this warning could result in serious injury or death in the event of a collision.










Safety Symbols

This section describes the safety symbols that appear in the Aluminum TMA Cartridge Patching Guide. Read the Guide for complete safety and repair information.

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

Warnings and Cautions

Read all instructions before repairing the Aluminum TMA Cartridge.

	WARNING: Read the instructions carefully. Be familiar with the complete repair instructions for the Energy Absorption Systems Aluminum Cartridge before repairing the Energy Absorption Systems Aluminum Cartridge. Failure to follow this warning could result in serious injury or death in the event of a collision.
	WARNING: Be sure adequate time is available for complete repair before beginning the repair process. Failure to follow this warning could result in serious injury or death in the event of a collision.
	WARNING: Do not repair the Energy Absorption Systems Aluminum Cartridge until you have read this Guide thoroughly and completely understand it. Please call Energy Absorption Systems at (888) 323-6374 if you do not understand the instructions. Failure to follow this warning could result in serious injury or death in the event of a collision.
	WARNING: Use only Energy Absorption Systems' parts for repairing the Energy Absorption Systems Aluminum Cartridge. Repairs using unauthorized accessories are strictly prohibited. Failure to follow this warning could result in serious injury or death in the event of a vehicle impact with a NONAPPROVED system.
	WARNING: DO NOT modify the Energy Absorption Systems Aluminum Cartridge 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 Energy Absorption Systems Aluminum Cartridge 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 installation 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.
	WARNING: Ensure that all Warnings, Cautions and Important statements within the Energy Absorption Systems Aluminum Cartridge Patching Guide are completely followed. Failure to follow this warning could result in serious injury or death in the event of a collision.
	WARNING: Failure to follow these warnings and cautions could result in serious injury or death.

Required Tools and Supplies

- Energy Absorption Systems' Cartridge Patching Kit
- Electric Drill Motor and 3/16" Bit Needed for "Pop-rivets"
- Pop-rivet Gun
- Roller or Rolling Pin
- 80 to 200 Grit General Purpose Sand Paper
- Screw Driver
- Small Round File
- Rubber Mallet
- 2x4 Lumber
- Putty Knife

Note: The above list of tools is a general recommendation. The actual number of tools required will depend on the complexity of the repair.

Patching Procedure

(Refer to Figures 1 & 2)

- 1) Use a rubber mallet to tap the damaged aluminum skin until it is flat. To flatten large areas, lay a section of 2x4 lumber over the area to be flattened and tap the 2x4 with the rubber mallet.
 - 2) Mark the area to be repaired and remove sharp corners.
 - 3) Be sure to locate the ends of any cracks or creases. The ends of any cracks or creases should be drilled and reamed into a smooth circular shape to provide a radius that can better handle and transfer stresses.
 - 4) Smooth the edges using a drill bit, small round file, and sand paper.
 - 5) Mark the area to be patched including a margin of at least 3" of undamaged cartridge for the patch to be secured to.
 - 6) Using up to 5 sheets*, cover the entire width of the underside of the cartridge and up the sides approximately 6" to 8", spanning lengthwise, two interior ribs or "diaphragms", one on either side of affected area (see Figure 1).
- * Each kit contains one 16" x 30" aluminum sheet. Multiple kits are required for larger repair areas.
- 7) Repair smaller cracks and dents in a similar manner using fewer materials (i.e. fewer kits). The overall process will be the same. Extend patching beyond the nearest row of rivets to take advantage of the diaphragm's support.

- 8) Lay out and trim the aluminum sheet and wire screen over the area to be repaired, overlapping 2" between sheets.
- 9) Trim the new aluminum sheets so that it will cover the marked area.
- 10) Pre-bend sheets that will run up the sides of the cartridge. Be sure to allow for the 2" overlap before bending.
- 11) Thoroughly sand the aluminum within the marked area using 80- to 200-grit sandpaper until the underlying aluminum is exposed and rough.
- 12) Wipe the sanded area with a clean cloth. Be sure it is free of any oils or grease.
- 13) Scuff both sides of the aluminum patching material.

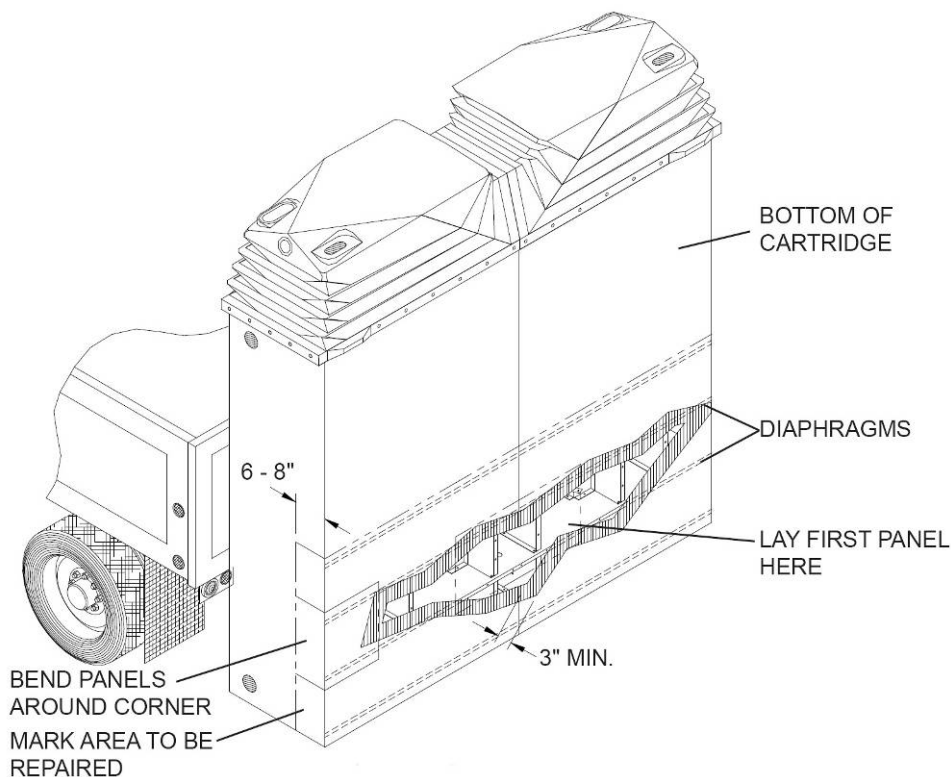


Figure 1

- 14) Apply adhesive (supplied in the Patching Kit) with a brush, covering to within 1" of inside the marked area. Remove any excess adhesive.
- 15) Starting in the middle of the marked area and working outwards, lay the trimmed aluminum sheets over the adhesive.
- 16) Determine where the internal supports are and drill the holes for the pop-rivets on 6" centers. Two 3/16" diameter holes should be drilled on 4" centers on either end of the sheet (see Figure 2).

- 17) Attach the sheet with pop-rivets.
- 18) After an aluminum sheet panel is installed, run a roller over the panel forcing the glue up against the aluminum top cover. This should be done as each sheet is added.
- 19) If needed, continue installing the aluminum sheets, from the center out to each side. Overlap the aluminum sheets 2", using adhesive between the new sheets. Repeat to cover entire marked area.
- 20) Use the two bent panels to fit the cartridge corners and approximately 6" to 8" up the sides.
- 21) Scrape off any excess glue at the seams with a putty knife.
- 22) Allow the adhesive to cure for 24 hours or longer before painting the patched area.
- 23) Prime and paint the entire patched area to match the cartridge. Apply the paint lightly and use several coats. Follow the directions on the paint can regarding drying time between coats.
- 24) Allow the paint to cure for 24 hours or longer before placing the cartridge into operation.

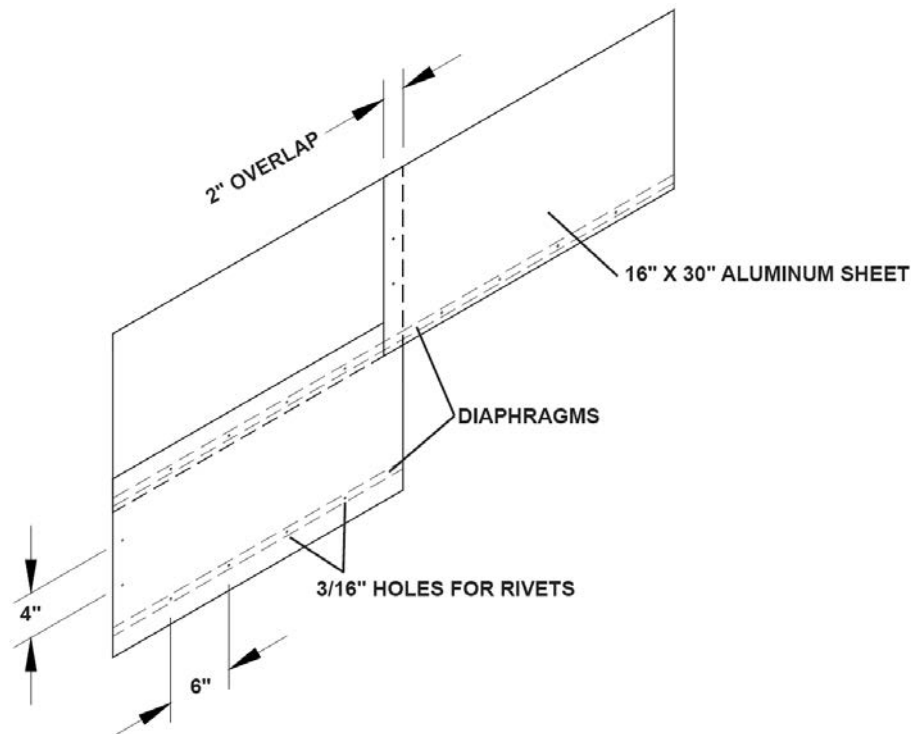


Figure 2



ENERGY ABSORPTION SYSTEMS, INC.

◆ A TRINITY INDUSTRIES, INC. COMPANY

2525 Stemmons Freeway
Dallas, Texas 75207
800-323-6374

www.energyabsorption.com
www.highwayguardrail.com