



April 18, 2008

In Reply Refer To: HSSD/CC-26I

Barry D. Stephens, P.E.  
Sr. Vice President Engineering  
Energy Absorption Systems, Inc.  
3617 Cincinnati Avenue  
Rocklin, CA 95678

Dear Mr. Stephens:

This letter is in response to your request for Federal Highway Administration (FHWA) acceptance of a roadside safety device for use on the National Highway System (NHS).

Name of device/system: Optimized version of a 9-cylinder REACT 350®  
Type of device/system: Redirective non-gating impact attenuator  
Test Level: NCHRP Report 350 Test Level 3 (TL-3)  
Testing conducted by: E-TECH Testing Services  
Date of request: November 12, 2007

You requested that we find this device acceptable for use on the NHS under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

#### **Requirements**

Roadside safety devices should meet the guidelines contained in the NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features". FHWA Memorandum "ACTION: Identifying Acceptable Highway Safety Features" of July 25, 1997, provides further guidance on crash testing requirements of longitudinal barriers.

#### **Description**

The REACT 350® uses an array of different energy absorbing cylinders with varying wall thicknesses to dissipate impact energy. We have accepted variations in the REACT system in FHWA acceptance letters beginning with CC-26 dated March 3, 1995, and most recently with CC-26H dated November 2, 2002. In your current request you asked for FHWA review and acceptance of an optimized system which is a self-restoring, redirective, non-gating crash cushion that can be used in temporary or permanent installations for both uni- and bi-directional traffic applications when appropriately transitioned and anchored.

The optimized system modified the rear four cylinders by making them slightly thicker and more robust. To support your request, you supplied an NCHRP 350 compliance report prepared by E-TECH Testing Services, Inc. that describes the REACT 350<sup>®</sup> as well as the three full-scale crash tests you conducted on this attenuator.

### **Crash Testing**

The Energy Absorption Systems developed the optimized REACT to withstand at least three consecutive impacts without requiring maintenance or resetting between impacts. You evaluated the redesign by conducting three full-scale NCHRP 350 tests. The first test you completed was NCHRP 350 test 3-30 (820C/100KPH/0 deg/ w/offset) which you then followed with two consecutive NCHRP 350 tests 3-31 (2000P/100KPH/0 deg). Your test report stated that all three tests were conducted over a five day period and the system received no maintenance or resetting between tests. Your three TL-3 tests (100 km/h) verified that the impact performance for light cars (820kg) was acceptable and that heavier vehicles could also be brought to a safe and controlled stop without resetting the test article. You also analyzed the other Report 350 tests recommended for impact attenuators and documented why no further testing was warranted by the cylinder modification.

### **Findings**

Based upon the successful completion of the aforementioned NCHRP 350 tests you provided, we agree that your 9 cylinder TL-3 model of the REACT 350<sup>®</sup> redirective, non-gating crash cushion can be used in temporary or permanent installations for both uni- and bi-directional traffic applications when appropriately transitioned and anchored. The system as described above may be used on the NHS when such use is acceptable to the contracting authority.

Please note the following standard provisions that apply to FHWA letters of acceptance:

- This acceptance is limited to the crashworthiness characteristics of the devices/systems and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
- Any changes that may adversely influence the crashworthiness of the device/system will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device/system being marketed is significantly different from the version that was crash tested, we reserve the right to modify or revoke our acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that it will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance is designated as number CC-26I and shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed at our office upon request.

- The REACT 350® is a patented product and considered proprietary. If proprietary devices/systems are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS projects, they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.
- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device/system for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate device/system, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

Sincerely yours,

David A. Nicol, P.E.  
Director, Office of Safety Design  
Office of Safety

Enclosures

FHWA:HSSD:NArtimovich:tb:x61331:4/14/08

File: s://directory folder/nartimovich/CC26I-easIREACTfin.doc

cc: HSSD (Reader, HSA; Chron File, HSSD; N.Artimovich, HSSD;  
MBloschock, HSSD; M.McDonough, HSSD)



U.S. Department  
of Transportation  
Federal Highway  
Administration

1200 New Jersey Avenue, SE.  
Washington, DC 20590

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**MOVING THE  
AMERICAN  
ECONOMY**



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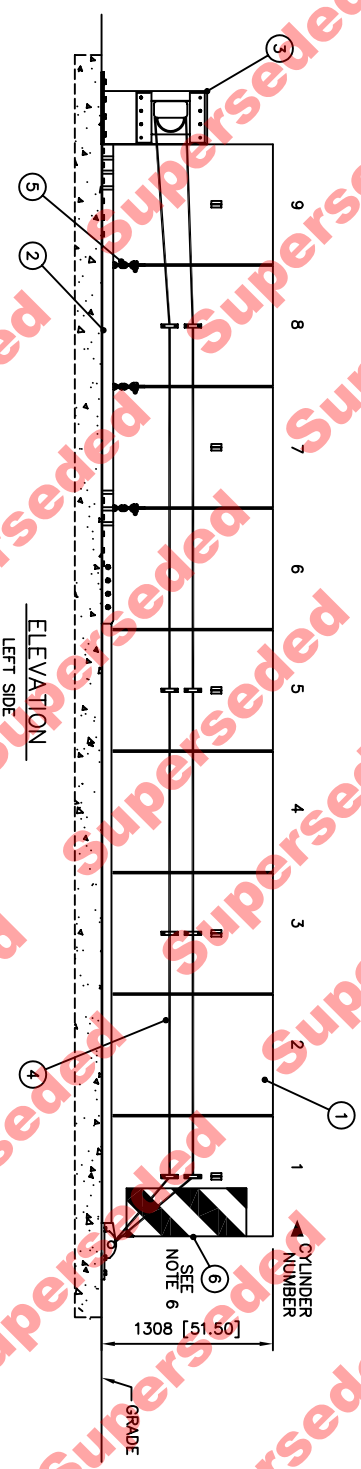
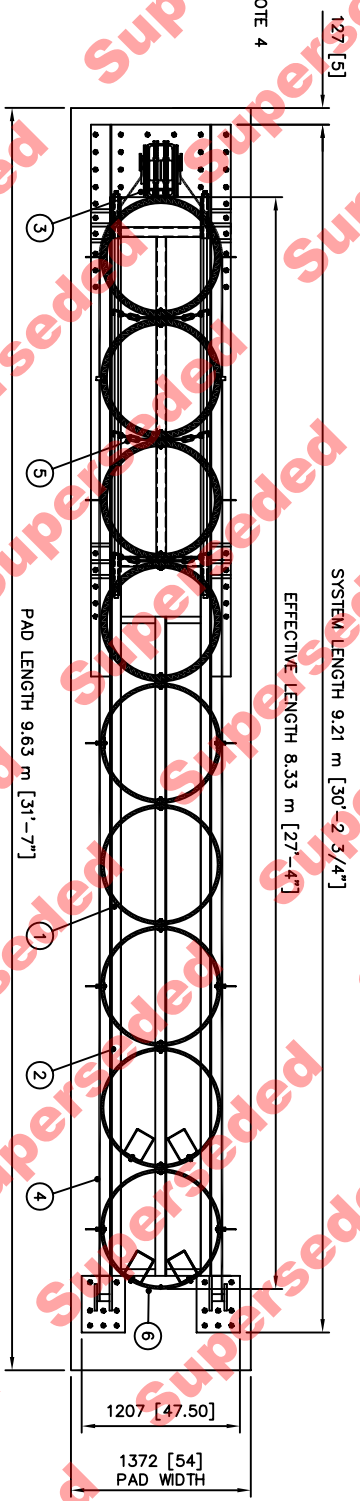
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Sincerely yours,



for David A. Nicol, P.E.  
Director, Office of Safety Design  
Office of Safety

Enclosures



CYL. NO.	O.D.	WALL THICKNESS
1	36"	1.4"
2	36"	1.4"
3	36"	1.4"
4	36"	1.4"
5	36"	1.0"
6	36"	0.9"
7	36"	0.9"
8	36"	0.8"
9	36"	0.8"

REVISIONS	DATE	REV. BY	CHKD. APP.
1			
2			
3			

REVISIONS	DATE	REV. BY	CHKD. APP.
1			
2			
3			

DESCRIPTION	DATE
A. COX	11/12/07

MODEL NO. 62B036

**ENERGY ABSORPTION SYSTEMS, INC.**  
ENGINEERING AND RESEARCH DEPARTMENT

REACT 350<sup>®</sup> SYSTEM  
W/SELF CONTAINED BACKUP  
FULLY SELF-RESTORING

SCALE: 1:40 DRAW: R62B036 SHEET: 1 of 1 REV: -

DESCRIPTION	DATE
A. COX	11/12/07