



U.S. Department
of Transportation
Federal Highway
Administration

1200 New Jersey Ave., SE
Washington, D.C. 20590

December 18, 2015

In Reply Refer To:
HSST/CC-35L

Mr. Bret Eckert P.E.
Engineering Applications Manager
Trinity Highway Products
3617 Cincinnati Avenue
Rocklin, CA 95677

Dear Mr. Eckert:

This letter is in response to your August 1, 2014 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number CC-35L and is valid until a subsequent letter is issued by FHWA that expressly references this device.

Decision

The following devices are eligible, with details provided in the form which is attached as an integral part of this letter:

- QuadGuard System Modification

Scope of this Letter

To be found eligible for Federal-aid funding, modified roadside safety devices should meet the crash test and evaluation criteria contained in the National Cooperative Highway Research Program (NCHRP) Report 350. However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.

Eligibility for Reimbursement

FHWA previously issued an eligibility letter for the roadside safety system described in your pending request. Your pending request now identifies a modification to that roadside safety system.

The original roadside safety device information is:

Name of system: QuadGuard
Type of system: Crash Cushion
Date of original request: February 20, 1996
Date of original FHWA eligibility letter: June 21, 1996
FHWA Control number: CC-35

The modification(s) to the QuadGuard covered by this letter are:

1. Modified the QuadGuard Product Manual to the current Trinity Highway format. In addition, the recommended anchor torque value for asphalt was improved from <10 ft-lbs to 10 ft-lbs.
2. Modified the dimension format on the QuadGuard cartridge box from decimal to fractional and changed the molded in company name. Adjusted the tolerances that are consistent with typical blow molding process capabilities for items this size. Improved identification of the cartridge type on the outside of the box from self-adhesive decal to painted on cartridge type.
3. Improved the diaphragm lower reinforcements horizontal fillet weld by increasing total weld length on each surface from 17" to 18".
4. Improved the hinge pivot attachment on the diaphragm hinge plates.
5. Improved the method of ensuring consistent preloading of the fender panel rear tension springs from compressing 1/16" to 1/8", to tightening the nut on mushroom washer bolt until it reaches end of threads. This method eliminates nut loosening and maintains consistent fender panel end gap. The protective coating on the fender panel springs was improved from power coated to mechanically galvanized. The spring rate will be unchanged yielding superior corrosion protection.
6. Modified the channel used for QuadGuard transition bracing by adding a 1" x 11/16" slot for galvanizing drainage.
7. Modified the steel nose on QuadGuard II by adding a small ink "W" letter on the side below the attachment holes for identification of wide nose components.

FHWA concurs with the recommendation of the accredited crash testing laboratory as stated within the attached form.

Full Description of the Eligible Device

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

Notice

If a manufacturer makes any modification to any of their roadside safety hardware that has an existing eligibility letter from FHWA, the manufacturer must notify FHWA of such modification with a request for continued eligibility for reimbursement. The notice of all modifications to a device must be accompanied by:

- Significant modifications – For these modifications, crash test results must be submitted with accompanying documentation and videos.
- Non-signification modifications – For these modifications, a statement from the crash test laboratory on the potential effect of the modification on the ability of the device to meet the relevant crash test criteria.

FHWA's determination of continued eligibility for the modified hardware will be based on whether the modified hardware will continue to meet the relevant crash test criteria.

You are expected to supply potential users with sufficient information on design, installation and maintenance requirements to ensure proper performance.

You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of the NCHRP Report 350.

Issuance of this letter does not convey property rights of any sort or any exclusive privilege. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.

Standard Provisions

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number CC-35L 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 upon request.
- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.
- If the subject device is a patented product it may be considered to be proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid projects: (a) they 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.

Sincerely yours,

A handwritten signature in blue ink that reads "Michael S. Griffith". The signature is written in a cursive, flowing style.

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	December 16, 2015	<input type="radio"/> New <input checked="" type="radio"/> Resubmission
	Name:	Bret R. Eckert, P.E.	
	Company:	Trinity Highway Products, LLC	
	Address:	3617 Cincinnati Ave., Rocklin, CA 95765	
	Country:	USA	
	To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies	

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
	<input checked="" type="radio"/> Physical Crash Testing <input type="radio"/> Engineering Analysis	QuadGuard® System	NCHRP Report 350	TL3

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the NCHRP Report 350 (Report 350) and that the evaluation results meet the appropriate evaluation criteria in the Report 350.

Identification of the individual or organization responsible for the product:

Contact Name:	Jim Thonn	Same as Submitter <input type="checkbox"/>
Company Name:	Trinity Highway Products, LLC	Same as Submitter <input checked="" type="checkbox"/>
Address:	70 West Madison Street, Suite 2350, Chicago, IL 60602	Same as Submitter <input type="checkbox"/>
Country:	USA	Same as Submitter <input checked="" type="checkbox"/>

Enter below all disclosures of financial interests as required by the FHWA 'Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.

The QuadGuard® technology is the commercial embodiment of intellectual property that is protected by patents that are owned by Trinity Highway Products, LLC (THP). THP does not pay royalties for sales of the QuadGuard® system. The QuadGuard® system was designed and developed by engineers at Energy Absorption Systems Inc. (EAS). The patent holders of record for the QuadGuard® system are Michael H. Oberth and John V. Machado, were employed by EAS. The associated United States Patent Office patent numbers (5,733,062, RE41,988 and 5,797,592) are assigned to Energy Absorption Systems, Inc. / Trinity Industries, Inc.

EAS sponsored certain crash tests of the QuadGuard® system; such tests were conducted by E-Tech Testing Services, an independent, wholly-owned subsidiary of THP. E-Tech Testing Services is an International Standards Organization ("ISO") 17025 accredited laboratory with American Association for Laboratory Accreditation (A2LA) Mechanical Testing certificate 989.01. Full-scale crash testing on the QuadGuard® system was performed in accordance with testing criteria, as set forth by the National Cooperative Highway Research Program ("NCHRP") in the NCHRP Report 350 (1993).

PRODUCT DESCRIPTION

☐ New Hardware or Significant Modification	☐ Modification to Existing Hardware	Non-Significant
<p>The QuadGuard® and QuadGuard® II systems are redirective, non-gating type crash cushions. The systems consists of energy absorbing cartridges surrounded by a framework of steel Quad-Beam guardrail that can telescope rearward during head-on impacts. The systems have a center monorail that will resist lateral movement during side angle impacts and a back up structure that will resist rearward movement during head-on impacts. The QuadGuard® and QuadGuard® II systems are approved for use per FHWA acceptance letter series CC-35 (dated Jun. 21, 1996 thru Nov. 19, 2010). The design changes presented in this submission consist of the following inconsequential and positive component modifications.</p> <p>1) Modified the QuadGuard® Product Manual to the current Trinity Highway format. In addition, the recommended anchor torque value for asphalt was improved from <10 ft-lbs to 10 ft-lbs. These are inconsequential modifications on the QuadGuard® system.</p> <p>2) Modified the dimension format on the QuadGuard® cartridge box from decimal to fractional and changed the molded in company name. Adjusted the tolerances that are consistent with typical blow molding process capabilities for items this size. Improved identification of the cartridge type on the outside of the box from self adhesive decal to painted on cartridge type. These are inconsequential modifications on the QuadGuard® system.</p> <p>3) Improved the diaphragm lower reinforcements horizontal fillet weld by increasing total weld length on each surface from 17" to 18". This is a positive modification on the QuadGuard® system.</p> <p>4) Improved the hinge pivot attachment on the diaphragm hinge plates. This is a positive modification on the QuadGuard® system.</p> <p>5) Improved the method of ensuring consistent preloading of the fender panel rear tension springs from compressing 1/16" to 1/8", to tightening the nut on mushroom washer bolt until it reaches end of threads. This method eliminates nut loosening and maintains consistent fender panel end gap. The protective coating on the fender panel springs was improved from power coated to mechanically galvanized. The spring rate will be unchanged yielding superior corrosion protection. These are positive modifications on the QuadGuard® system.</p> <p>6) Modified the channel used for QuadGuard® transition bracing by adding a 1" x 11/16" slot for galvanizing drainage. This is a positive modification on the QuadGuard systems.</p> <p>7) Modified the steel nose on QuadGuard® II by adding a small ink "W" letter on the side below the attachment holes for identification of wide nose components. This is an inconsequential modification on the QuadGuard® system.</p> <p>These component modifications for the QuadGuard® and QuadGuard® II systems are considered Non-Significant. All revisions have been justified through engineering analysis and judgement and have been determined to be non-significant and will have no bearing on the as-tested performance of the system.</p>		

CRASH TESTING

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-30 (820C)	Test No. 01-7620-007, Test Date May 3, 1996, Test Report "NCHRP Report 350 Crash Test Results for the QuadGuard System, Final Report, Project No. 01-7620, May 1996. The non-significant modifications described in the Product Description will have no bearing on the as-tested performance of the QuadGuard® system.	PASS
S3-30 (700C)	Not Applicable. Test S3-30 is an optional test and not required for QuadGuard® system eligibility.	
3-31 (2000P)	Test No. 01-7620-006, Test Date May 1, 1996, Test Report "NCHRP Report 350 Crash Test Results for the QuadGuard System, Final Report, Project No. 01-7620, May 1996. The non-significant modifications described in the Product Description will have no bearing on the as-tested performance of the QuadGuard® system.	PASS
3-32 (820C)	Test No. 01-7620-008, Test Date May 7, 1996, Test Report "NCHRP Report 350 Crash Test Results for the QuadGuard System, Final Report, Project No. 01-7620, May 1996. The non-significant modifications described in the Product Description will have no bearing on the as-tested performance of the QuadGuard® system.	PASS
S3-32 (700C)	Not Applicable. Test S3-32 is an optional test and not required for QuadGuard® system eligibility.	
3-33 (2000P)	Test No. 01-7620-005, Test Date April 26, 1996, Test Report "NCHRP Report 350 Crash Test Results for the QuadGuard System, Final Report, Project No. 01-7620, May 1996. The non-significant modifications described in the Product Description will have no bearing on the as-tested performance of the QuadGuard® system.	PASS
3-34 (820C)	Not Applicable. Test 3-34 is for redirective, gating devices and not applicable for QuadGuard® system eligibility.	
S3-34 (700C)	Not Applicable. Test S3-34 is an optional test and not required for QuadGuard® system eligibility.	
3-35 (2000P)	Not Applicable. Test 3-35 is for redirective, gating devices and not applicable for QuadGuard® system eligibility.	
3-36 (820C)	Test No. 01-7620-004, Test Date November 28, 1995, Test Report "NCHRP Report 350 Crash Test Results for the QuadGuard System, Final Report, Project No. 01-7620, May 1996. The non-significant modifications described in the Product Description will have no bearing on the as-tested performance of the QuadGuard® system.	PASS
S3-36 (700C)	Not Applicable. Test S3-36 is an optional test and not required for QuadGuard® system eligibility.	
3-37 (2000P)	Test No. 01-7620-002, Test Date November 17, 1995, Test Report "NCHRP Report 350 Crash Test Results for the QuadGuard System, Final Report, Project No. 01-7620, May 1996. The non-significant modifications described in the Product Description will have no bearing on the as-tested performance of the QuadGuard® system.	PASS
3-38 (2000P)	Test No. 01-7620-003, Test Date November 21, 1995, Test Report "NCHRP Report 350 Crash Test Results for the QuadGuard System, Final Report, Project No. 01-7620, May 1996. The non-significant modifications described in the Product Description will have no bearing on the as-tested performance of the QuadGuard® system.	PASS

Required Test Number	Narrative Description	Evaluation Results
3-39 (2000P)	Test No. 01-7620-001, Test Date November 7, 1995, Test Report "NCHRP Report 350 Crash Test Results for the QuadGuard System, Final Report, Project No. 01-7620, May 1996. The non-significant modifications described in the Product Description will have no bearing on the as-tested performance of the QuadGuard® system.	PASS
3-40 (2000P)	Not Applicable. Test 3-40 is for nonredirective, gating devices and not applicable for QuadGuard®system eligibility.	
S3-40 (700C)	Not Applicable. Test S3-40 is optional test for nonredirective, gating devices and not applicable for QuadGuard®system eligibility.	
3-41 (2000P)	Not Applicable. Test 3-41 is for nonredirective, gating devices and not applicable for QuadGuard®system eligibility.	
3-42 (820C)	Not Applicable. Test 3-42 is for nonredirective, gating devices and not applicable for QuadGuard®system eligibility.	
S3-42 (700C)	Not Applicable. Test S3-42 is optional test for nonredirective, gating devices and not applicable for QuadGuard®system eligibility.	
3-43 (2000P)	Not Applicable. Test 3-43 is for nonredirective, gating devices and not applicable for QuadGuard®system eligibility.	
3-44 (2000P)	Not Applicable. Test 3-44 is for nonredirective, gating devices and not applicable for QuadGuard®system eligibility.	

Full Scale Crash Testing was done in compliance with NCHRP Report 350 by the following accredited crash test Laboratory. By signature below, the Laboratory agrees in support of this submission that all critical and relevant crash tests for the device listed above were conducted. (cite the laboratory's accreditation status as noted in the crash test reports.):

Testing Laboratory's signature concurs that these modifications are considered Non-Significant.		
Laboratory Name:	E-Tech Testing Services, Inc.	
Laboratory Signature:	Paul Kruse	<small>Digitally signed by Paul Kruse DN: cn=Paul Kruse, o=E-TECH Testing Services, ou=Plant 1574, email=paul.kruse@trin.net, c=US Date: 2015.12.17 10:38:08 -0800</small>
Address:	3617B Cincinnati Ave., Rocklin, CA 95765	Same as Submitter <input type="checkbox"/>
Country:	USA	Same as Submitter <input checked="" type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	A2LA Certificate# 989.01, November 30, 2017	

Submitter Signature*: bret.eckert@trin.net

Digitally signed by
bret.eckert@trin.net
DN: cn=bret.eckert@trin.net
Date: 2015.12.17 10:36:27 -0800

Submit Form

ATTACHMENTS

Attach to this form:

- 1) Additional disclosures of related financial interest as indicated above.
- 2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
- 3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [[Hardware Guide Drawing Standards](#)]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

Eligibility Letter		AASHTO TF13	
Number	Date	Designator	Key Words



3617 Cincinnati Ave, Rocklin, CA 95765
(916) 645-8181 Fax No (916) 645-3495

October 30, 2015

Mr. William P. Longstreet
Highway Engineer, Safety Design Team
Office of Safety Technologies, Rm E71-107
Federal Highway Administration
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Re: QuadGuard[®] Disclosure of Financial Interest, FHWA Review for Eligibility Letter

Mr. Longstreet,

On behalf of Trinity Highway Products, LLC ("THP"), I am responding to your email requesting details of any financial interest that the crash test laboratory has in the QuadGuard[®] system, manufactured by THP.

As noted in THP's request for eligibility for reimbursement under the Federal-aid highway program for this product, the QuadGuard[®] system was previously deemed eligible by the FHWA, pursuant to HNG-14/CC-35, HNG-14/CC-35A, HNG-14/CC-35B, HMHS/CC-35C, HSA-1/CC-35D, HSA-10/CC-35E, HSA-10/CC-35F, HSA-10/CC-35G, HSSD/CC-35H, HSSD/CC-35I, HSSI/CC-35J, HNG-14/CC-42, HSA-10/CC-42A, & HSSD/CC-42B.

The QuadGuard[®] technology is the commercial embodiment of intellectual property that is protected by patents that are owned by THP. THP does not pay royalties for sales of the QuadGuard[®] system. The QuadGuard[®] system was designed and developed by engineers at Energy Absorption Systems Inc. (EAS). The patent holders of record for the QuadGuard[®] system are Michael H. Oberth and John V. Machado and both, Mr. Oberth as well as Mr. Machado, were employed by EAS. The associated United States Patent Office patent application numbers (5,797,592 & 5,733,062) are assigned to Energy Absorption Systems, Inc. / Trinity Industries, Inc.

EAS sponsored certain crash tests of the QuadGuard[®] system; such tests were conducted by E-Tech Testing Services, an independent, wholly-owned subsidiary of THP. E-Tech Testing Services is an International Standards Organization ("ISO") 17025 accredited laboratory with American Association for Laboratory Accreditation (A2LA) Mechanical Testing certificate 989.01. Full-scale crash testing on the QuadGuard[®] system was performed in accordance with testing criteria, as set forth by the National Cooperative Highway Research Program ("NCHRP") in the NCHRP Report 350 (1993).

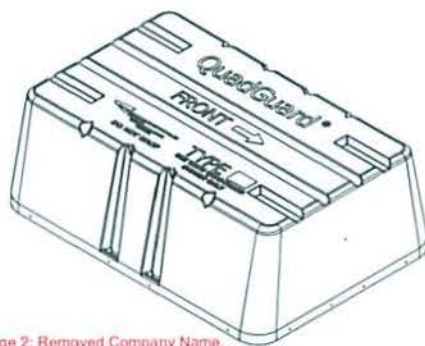
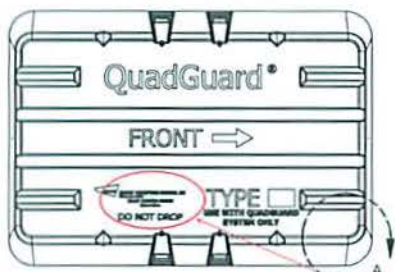
Please advise if further information is required by the FHWA. We look forward to continuing to work with the FHWA in regards to the QuadGuard[®] and other Roadside Safety Hardware.

Sincerely,

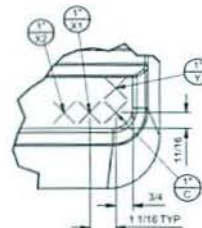
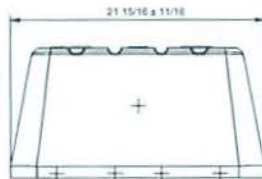
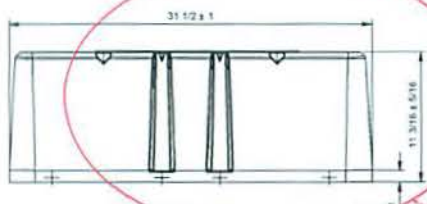
A handwritten signature in black ink that reads "Bret Eckert". The signature is written in a cursive style with a long horizontal stroke at the end.

Bret Eckert, P.E.
Engineering Applications Manager
Trinity Highway

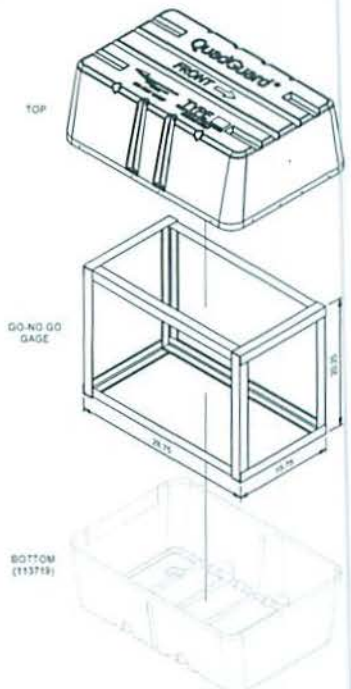
Office 916-644-9131
bret.eckert@trin.net



Change 2: Removed Company Name.



DETAIL A
SCALE 1/4
MINIMUM WALL AT 'X' = .065"
MINIMUM WALL AT 'Y' = .082"
TYPICAL 4 CORNERS



DETAIL A
SEE NOTE 6

- NOTES
1. ALL TEXT TO BE RAISED 1/16"
 2. MINIMUM CORNER THICKNESS TO BE .065"
 3. MINIMUM PART THICKNESS TO BE .082"
 4. DIMENSIONS ARE FOR FINAL PART.
 5. ALL OUTSIDE FILLETS AND ROUNDS TO BE R1/16" UNLESS OTHERWISE NOTED.
 6. THE CARTRIDGE BOX TOP SHALL FIT AND PROPERLY MATE WITH THE CARTRIDGE BOX BOTTOM WHILE THE GAUGE IS PLACED IN THE BOX BOTTOM.
 7. FOR ADDITIONAL MOLDED PART DIMENSIONS SEE DRAWING E20637

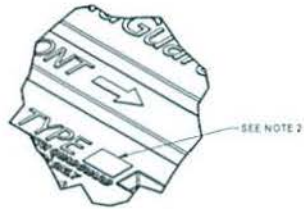
The drawings and the information shown thereon are copyrighted by TRINITY HIGHWAY PRODUCTS, LLC (2012) and the sole property of TRINITY HIGHWAY PRODUCTS, LLC. Neither the drawings nor such information is to be used for any purpose other than that for which it was specifically furnished from TRINITY HIGHWAY PRODUCTS, LLC, nor is any reproduction authorized without written permission.

ESTIMATED WEIGHT: 4.05 Emsast

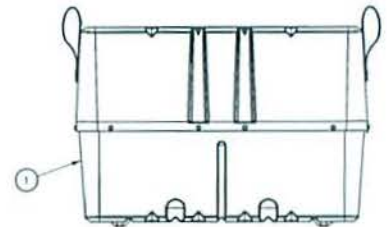
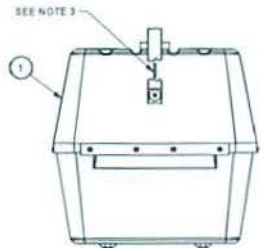
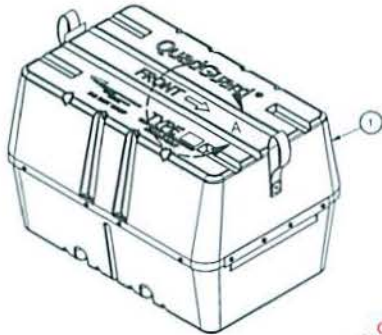
DR: D. Hayes Jr	DATE: 5/13/2005	TOLERANCES PER: QMS-SF-001 UNLESS OTHERWISE SPECIFIED
DESIGN: A. Cox	DATE: 8/30/2005	DO NOT SCALE DRAWINGS
ECCO Date: Rev: By: Dwg:		
REV: 1	DATE: 4/27/10	BY: DCS
REV: 2	DATE: 6/3/13	BY: DDW JME
REV: 3	DATE: 5/6/14	BY: WWL BRE

TOP_BOX,CARTRIDGE_QG,BLW MOLD	
210961	N/A
117808	1 of 1

PARTS LIST			
ITEM	STOCK NO	DESCRIPTION	QTY
1	617411B	CARTRIDGE ASSY, TYPE I, QG, W/O LABELS	1



DETAIL A
SCALE 1:1



Change 2: Cartridge Type identification improved from self adhesive decal to painted on identification.

- NOTES
 1 BEZEL TO MANUFACTURING PROCEDURE NO. 115994
 2 PAINT 'I' ON RAISED AREA
 3 STENCIL 'I' WHITE LETTERING, 1 1/2" HIGH TEXT 2 PLACES (SHORT SIDES)

The drawings and the information shown thereon are copyrighted by TRINITY HIGHWAY PRODUCTS, LLC. (2012) and the sole property of TRINITY HIGHWAY PRODUCTS, LLC. Neither the drawings nor such information is to be used for any purpose other than that for which it was specifically furnished from TRINITY HIGHWAY PRODUCTS, LLC, nor is any reproduction authorized without written permission.

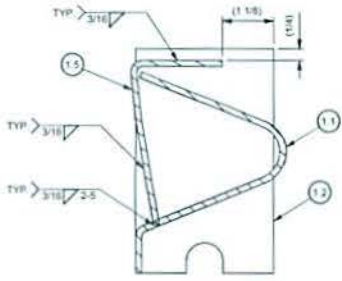
D Status	4/25/1995
SPT	10/15/1996
Revision	1/14/1998 21671012000 4250577 AND 16 710M 11 QTY WAS 18 REWORKED REWORKED REWORKED
ESTIMATED WEIGHT	258.99 lbmax

TOLERANCES PER QMS-SF-001, UNLESS OTHERWISE SPECIFIED	
DO NOT SCALE DRAWING	
ECO	Date Rev By Ck
2340	10/29/07 J DGS JME
2909	6/16/10 K DGS KRM
3870	4/28/14 L WWL BRE

CARTRIDGE ASSY, TYPE I, QG	
SEE PARTS LIST	N/A
606027	1 of 1

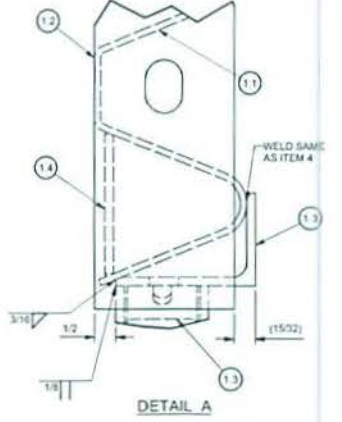
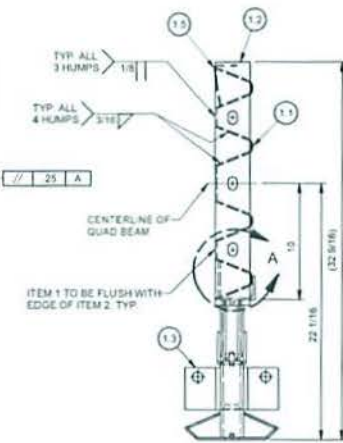
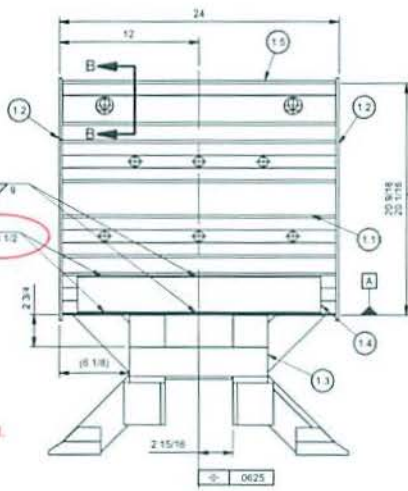
TOL ANGULAR 1/8 1/16
 TOL FRACTIONAL 1/8 1/16
 TOL DECIMAL .005 .01
 TOL DECIMAL .005 .005
 ALL DIMENSIONS UNLESS SPECIFIED
 DO NOT SCALE DRAWING

PARTS LIST			
ITEM	STOCK NO	DESCRIPTION	QTY
1	607820B	DIAPHRAGM QB 24 QGE	1
1.1	612992B	QUAD BEAM DIAPHRAGM 21 1/2	1
1.2	609479B	FLT ST 14X3X21 WHOLE	2
1.3	607212B	DIAPHRAGM LEG WELDMENT 24 QG	1
1.4	606761B	FTB ST 3-16X3X20 7/8	1
1.5	610010B	GUARD EDGE QG ELITE 24	1



SECTION B-B

TYP ITEM 4 TO ITEM 1 CENTERED
 TYP ITEM 4 TO ITEM 1 FROM EACH END



DETAIL A

Change 3: Outer weld was 2-3.

NOTES
 1 FINISH AND GENERAL WORKMANSHIP PER EAS-SF-002 UNLESS OTHERWISE SPECIFIED.
 2 GALVANIZE PER ASTM A-123

Revision	ECO	Date	Rev	By	Chk	App
ADD HOLES TO 1.1 EPS DESCRIPTION	3139	12/30/11	D	DPH	JME	MJB
MADE DIMS ON SECTION B-B REFERENCE	3536	1/8/13	E	WWL	JME	RCB
REVISED WELDS IN FRONT VIEW	3696	8/26/13	F	DDW	JME	RCB

DESIGNER L. Corker	DATE 8/22/2002
PROFESSOR R. Blum	DATE 11/11/1998
DRIVER K. Mortensen	DATE 8/29/2002
MANAGER D. Blom	DATE 8/27/2002

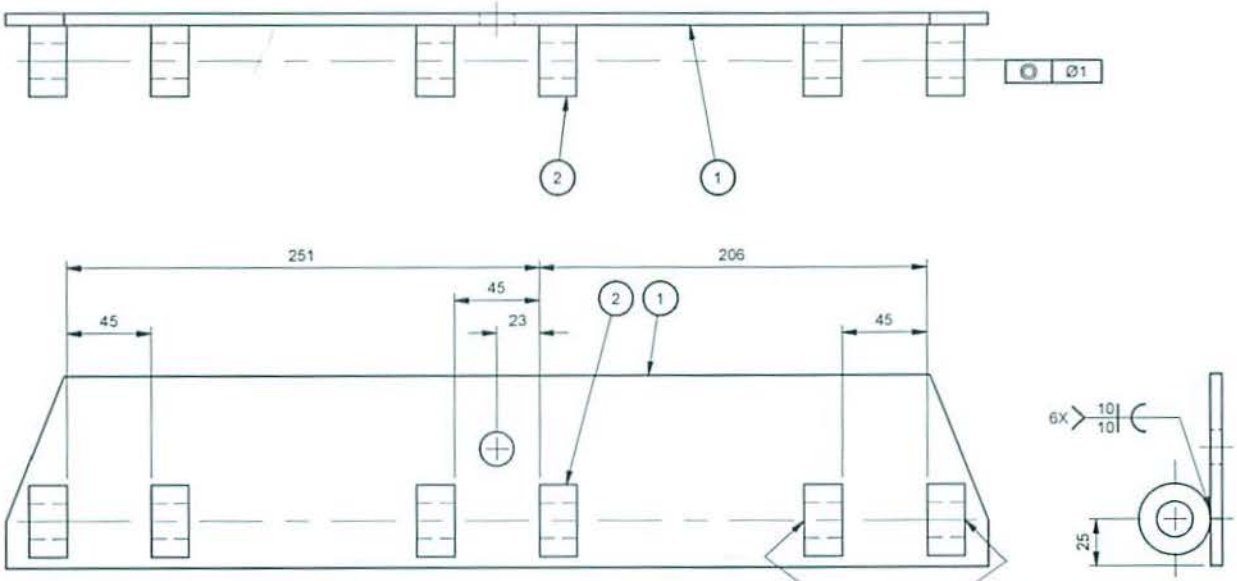
PART NO. 607820G
 PART NO. 607820B

ENERGY ABSORPTION SYSTEMS
 ENGINEERING AND RESEARCH DEPARTMENT

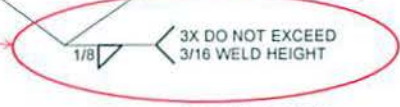
DIAPHRAGM, QB, 24, QGE

607820 1 of 1 F

MATERIAL SEE PARTS LIST	TOLERANCES PER EAS-SF-001, UNLESS OTHERWISE SPECIFIED.	PARTS LIST			
		ITEM	STOCK NO.	DESCRIPTION	QTY.
DO NOT SCALE DRAWING		1	609528B	FLT ST 1/4X4X20 9/16, W/HO	1
		2	616287B	TUB ST OD 1 1/2X.375WALLX3/4	6



Change 4: Added additional filled welds on outside of hinge pivots.

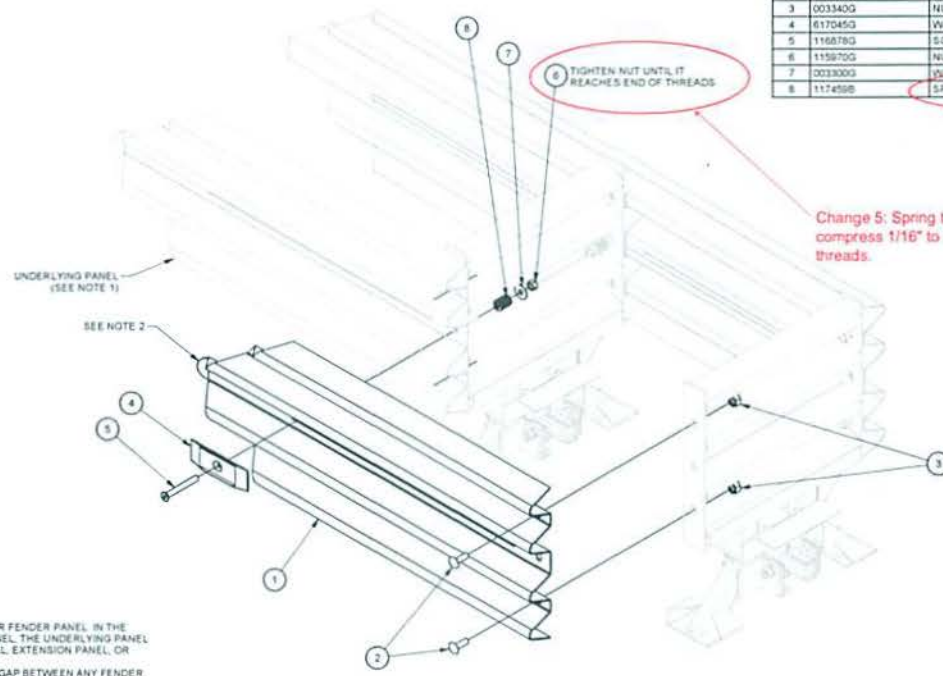


NOTES:
1. FINISH AND GENERAL WORKMANSHIP PER EAS-SF-002, UNLESS OTHERWISE SPECIFIED.

PART NO 610170B 7.34 lbmass

Revision							ECO	Date	Rev	By	Chk	App	D. MILLER 4/17/1998 KRM 4/22/1998 RBB 4/23/1998	ENERGY ABSORPTION SYSTEMS ENGINEERING AND RESEARCH DEPARTMENT	
PART NO WAS 2700434-0000							-	2/23/11	-	DK	/	/		HINGE PLATE, DIAPHRAGM, QG	610170
ADDED 1/8 WELD SYMBOL							3720	10/4/13	A	WWL	JME	RCB			

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS ACCORDING TO ASME Y14.5M UNLESS OTHERWISE SPECIFIED



PARTS LIST			
ITEM	STOCK NO	DESCRIPTION	QTY
1	611832B	PANEL FENDER QG	1
2	003400G	BOLT RAIL 5/8X2 G	2
3	003340G	NUT HX 5/8 G RAIL	2
4	617045G	WASHER MUSHROOM FORGED QG G	1
5	116678G	SCREW FL 5/8X5 G G HEX SOCKET	1
6	115970G	NUT HX 5/8 G	1
7	003300G	WASHER FL 5/8X1 1/4 G	1
8	117458B	SPRING DIE 1 1/4 ODK 91EX1 1/2 B	1

- NOTES:
1. UNDERLYING PANEL IS ANOTHER FENDER PANEL. IN THE CASE OF THE LAST FENDER PANEL THE UNDERLYING PANEL COULD BE A BACKUP SIDE PANEL EXTENSION PANEL OR TRANSITION PANEL.
 2. THERE IS TO BE A 30 [1.78] MAX. GAP BETWEEN ANY FENDER PANEL AND THE UNDERLYING PANEL.

Revision	Date	Rev	By	Chk	App
0001	4/23/04	1	DK	JME	AC
0002	5/4/11	-	DK	/	/
0003	12/26/11	J	STT	AJC	PLK

J. Espinoza	5/21/1996
JVM/MHO	2/29/1996
S. Trageser	5/4/2011
J. Machado	5/21/1996
608236.dwg	

ASSEMBLY NO. 608236B

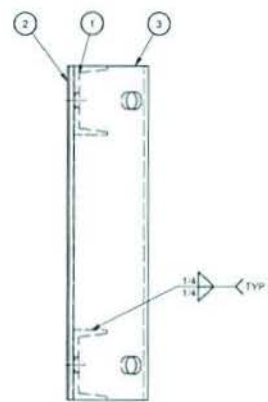
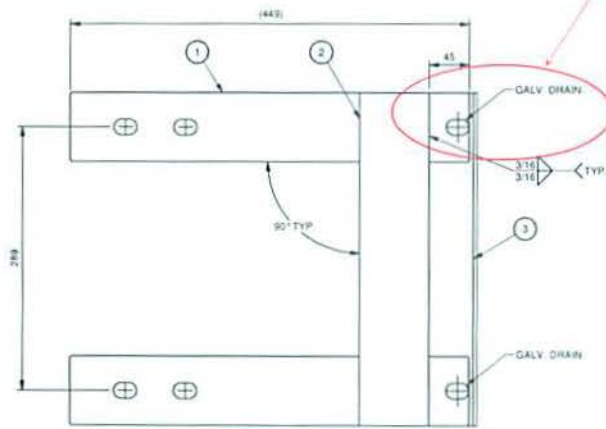
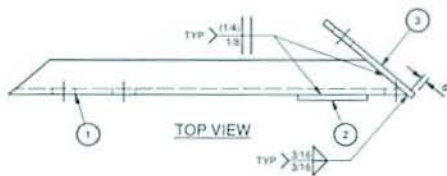
ENERGY ABSORPTION DIVISION
ENGINEERING AND RESEARCH DEPARTMENT

FENDER PANEL ASSY.QG

608236 1 of 1 J

TOL. ANGULAR: ± 1°
TOL. LINEAR: ± 2mil
UNLESS OTHERWISE NOTED

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	QTY.
1	6062553	CHL ST 3X5 DX17.316	2
2	6094729	FTB ST 14X3X14.38	1
3	6095533	FTB ST 14X5X14.38	1



Change 6: Improved transition bracket by adding 1" x 11/16" slot for drainage during hot dip galvanizing process.

SIDE VIEW

END VIEW

- NOTES
 1. WELD SIZES ARE IN INCHES
 2. FINISH AND GENERAL WORKMANSHIP PER EAS SF-002, UNLESS OTHERWISE SPECIFIED
 3. HOT DIP GALVANIZE AFTER FABRICATION PER ASTM A 123

Revision	ECO	Date	Rev	By	Chk	App
ADDED PERMS QTY AND ASS 1788		07/10/97	A	JF	BB	SPT
ADD FINISH SPEC. UNLESS NOTED & ADD TO FINISH SPECIFIED NOTES & ADD GALV. DRAIN HOLES	2503	10/10/12	B	WWL	KRM	SRE

J. Espinoza	9/25/1996
J. Machado	9/25/1996
K. H.M.	10/9/1996
J. Machado	10/10/1996

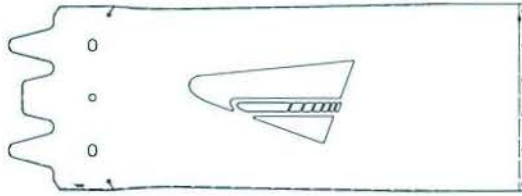
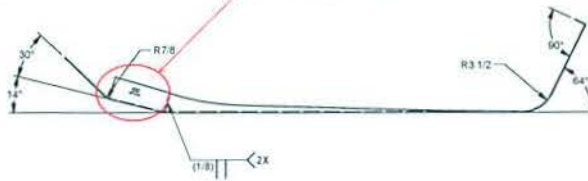
PART NO. 605338G
 PART NO. 605338B
 22 48 Brass

ENERGY ABSORPTION SYSTEMS
 ENGINEERING AND RESEARCH DEPARTMENT

BRACE, DIAGONAL, TRANSITION, Q6, G

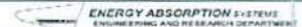
605338 1 of 1 3

Change 7: Improved wide steel nose identification by adding a "W" to the lower attachment flange.



PART NO. 611672Y (YELLOW)
PART NO. 611672W (BLACK)
PART NO. 611672G (GALV)
PART NO. 611672B

24 77 lb/mass



NOTES:
1. INSIDE BEND RADIUS TO BE R 0.75, UNLESS OTHERWISE SPECIFIED.

Revisions	ECO	Date	Rev	By	Chk	App
CAD PART NUMBER WAS 210014-0000 SEE SHEET 1 FOR WELD CHANGES	2909	6/17/10	D	DDS	KRM	ST
SEE SHEET 1	3067	1/20/11	E	DDS	/	/
SEE SHEET 1	3819	5/29/13	F	DPH	KRM	RCB

D. Kehrig	1/16/2009
M. Buehler	8/28/2008
JME	4/6/2009
R. Braugher	4/6/2009

UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN INCHES.
DIMENSIONS ACCORDING TO ASME Y14.5M UNLESS OTHERWISE SPECIFIED.



NOSE, L, WIDE, QGII, W/LOGO

611672 2 of 2 F

From: [John L. Adams](#)
To: [Lance@ast.illinois.edu](#)
Subject: RE: CASS S3 Post Sieve Clamp
Date: Thursday, December 03, 2015 1:50:44 PM

It's available at A2LA's website.



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C2 - Conditionally Available for Commercial Services	Type B - first and second party (not commercially available)
C3 - Not Normally Available for Commercial Services	Type C - first and second party, and also offering commercially available inspections

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