



U.S. Department
of Transportation
**Federal Highway
Administration**

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

December 23, 2009

In Reply Refer To:
HSSD/CC-95A

Mr. Geoff Maus
TrafFix Devices, Inc.
160 Ave. La Plata
San Clemente, CA 92673

Dear Mr. Maus:

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

Name of device: TrafFix Devices, Inc., Compressor
Type of device: Crash Cushion/Impact Attenuator
Test Level: NCHRP Report 350 Test Level 3
Testing conducted by: Karco Engineering
Date of request: May 21, 2009
Date completed package received by FHWA: November 3, 2009

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. The FHWA Memorandum titled "ACTION: Identifying Acceptable Highway Safety Features" of July 25, 1997, provides further guidance on crash testing requirements of longitudinal barriers.

Description

The TrafFix Devices Inc. Compressor is a re-directive, non-gating, bi-directional use crash cushion with overall length of 255.25 inches (6.5 m). Its effective length is 196 inches (4.98 m). The Compressor measures 48.66 inches (1.24 m) wide, and is 53.5 inches (1.36 m) in height.



The main components include: a steel structural Uni-Base, six plastic energy attenuating module elements, twelve steel fender panels, and an optional rear transition kit. The Uni-base is comprised of a dovetail rail which allows the modules to slide as they compress during an impact. The dovetail retains the six modules on the track, preventing lateral or vertical movement upon impact. Attached to the Compressor Module sides are twelve fender panels connected to the lower edge clips of each module. Attached to the rear fender panel's trailing edge is the transition kit, designed to redirect an impacting vehicle approaching in a reverse direction.

The transition kit consists of four main components: a shorter fender panel, lateral rear support frame, a standard thrie beam panel section, and an end shoe. The short fender panel is the same profile design as the fender panels used on the Compressor sides. The lateral support frame is made of steel angle and plate. The lateral frame provides structural support within the 38-inch (965-mm) gap region when impacted in the reverse direction and re-directs the impacting vehicles. The standard thrie beam section is a transition panel with a shoe end attached. Horizontal mounting bolts are used to anchor the transition shoe to the CMB, using 1 inch-8 insert bolts along the shoe flange trailing edge.

The transition kit attaches directly to the existing Compressor fender panels by bolting to the short fender panels and adding a standard thrie beam at a 10 degree position to the CMB. The lateral support frame bolts directly to the existing concrete mounting anchor bolts. The transition includes two wood offset blocks between the transition rail and the face of the concrete barrier. The blocks may be cut as needed for transitioning to safety-shaped, constant slope, or vertical barriers.

Fourteen 3/4-inch (19-mm) concrete anchor bolts are used to secure the Compressor to the concrete test pad. The anchor bolts are 5 to 6 inches (127 mm to 152.4 mm) of ACME thread below grade with a 1-inch (25.4-mm) shoulder and 3/4 inches (19 mm)-10 x 1-1/2" (38.1 mm) above grade to secure the base to the studs. A high strength two part catalyzed resin anchoring material is used to secure the anchor bolts below grade.

Crash Testing

The Traffix Devices Inc. Compressor was initially found acceptable in FHWA Acceptance Letter CC-95, dated February 26, 2007. This letter indicated that the reverse direction test, NCHRP Report 350 Test 3-39, needed to be run in order for the Compressor to be considered for bi-directional use. Your present request is based on the Test 3-39 you conducted on March 27, 2009, a summary of which is enclosed for reference. All occupant risk and vehicle trajectory results were satisfactory.

Findings

The device described above and detailed in the enclosed drawings is acceptable for use on the NHS under the range of conditions tested, when acceptable to a highway agency.

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

- This acceptance is limited to the crashworthiness characteristics of the devices 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 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 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-95A 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 Compressor is a patented product and considered proprietary. If proprietary devices are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS 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.
- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate device, 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:x61331:12/10/09

File: s://directory folder/nartimovich/CC95A_TrafFix_Rev-Dir_FIN.doc

cc: HSSD (Reader, HSA; Chron File, HSSD; N.Artimovich, HSSD; MMcDonough, HSSD;
DNicol, HSSD; HCC-1)



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Sincerely yours,



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

Enclosures

ITEM NO.	DESCRIPTION	QTY.
1	THREE BEAM SHOE END	1
2	THREE BEAM PANEL	1
3	SHORT TRANSOM PANEL	1
4	SMALL SHAPED WOOD BLOCK STANDOFF PRESSURE TREATED MATERIAL	1
5	LARGE SHAPED WOOD BLOCK STANDOFF PRESSURE TREATED MATERIAL	1
6	FRAME BRACE	1
7	1-3/8x5/8" EXPANSION ANCHOR BOLTS	9
8	3/4"-10x2" HEX BOLTS	9
9	3/4"-10x2" HEX BOLTS	9
10	3/4"-10 NUTS	9
11	1/2"x3" GALVANIZED LAG SCREWS (QTY 4)	4
12	1/2" WASHERS	4
13	3/4"-10x2" HEX BOLTS	3
14	3/4" WASHERS	4
15	3/4"-10 HEX NUTS	3
16	1/2"-13x1" HEX BOLTS	3
17	1/2" WASHERS	6
18	1/2"-13 NUTS	3
19	3/4"-10x2 3/4" ANCHOR BOLT	6
20	3/4" WASHERS	6
21	3/4"-10 NUTS	6

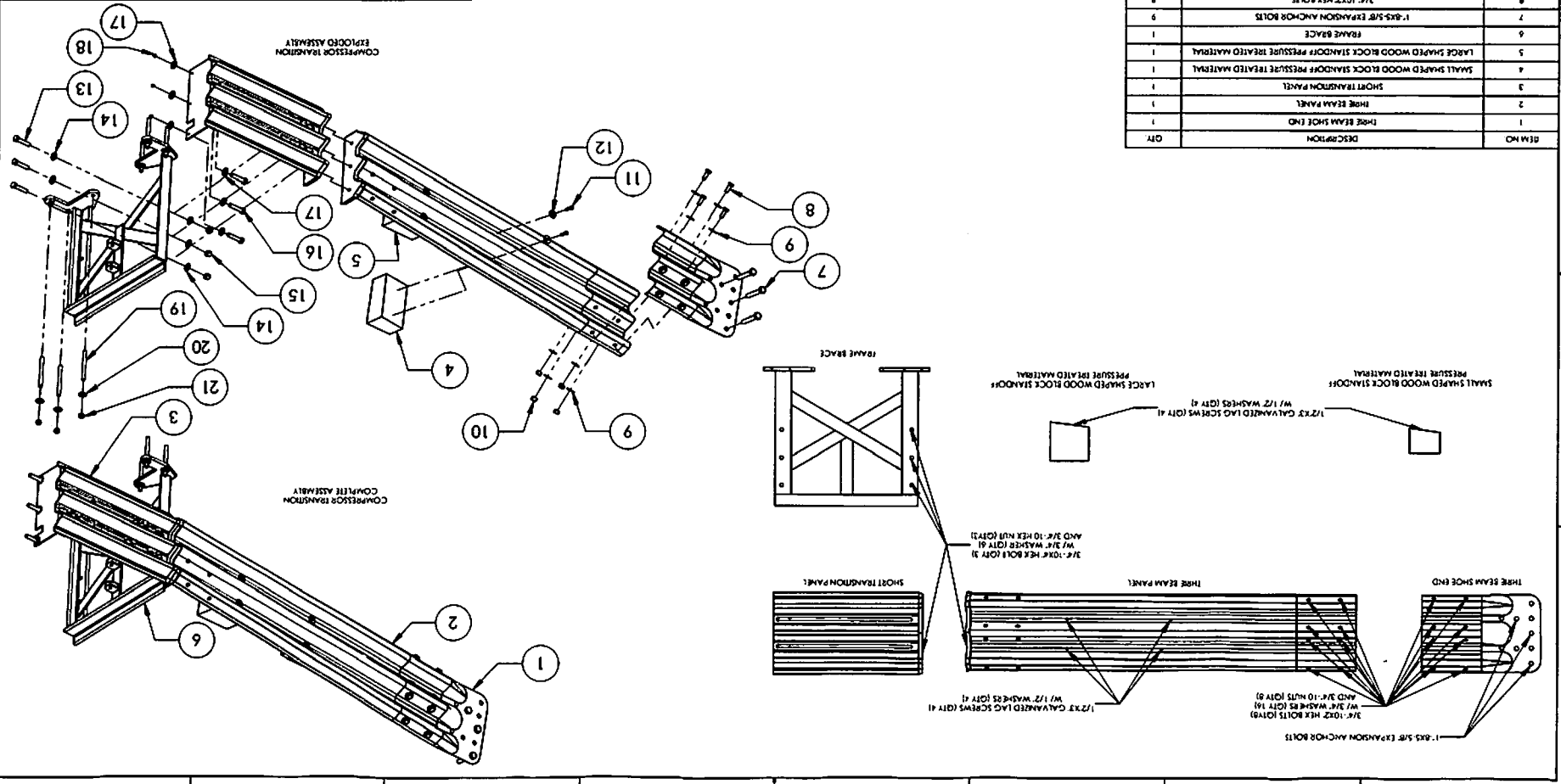
Trafix Inc.
 160 Avenida La Plata
 San Clemente, CA 92673
 (949) 361-5663
 FAX (949) 361-9205
 WWW.TRAFIXDEVICES.COM

TRANSITION COMPONENTS
 TITLE:

SIZE DWG. NO. **640**
 REV **C**

UNLESS OTHERWISE SPECIFIED
 ALL DIMENSIONS ARE IN INCHES (MM)
 TOLERANCES
 FINISHES
 PRECISION: .001 & .002
 STANDARD: .015 & .118" (1.5mm)
 GEOMETRIC: 1.0 & 2.5

DRAWN BY: []
 CHECKED BY: []
 APPROVED BY: []
 DATE: 10/20/09



1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8

A

A

B

B

C

C

D

D

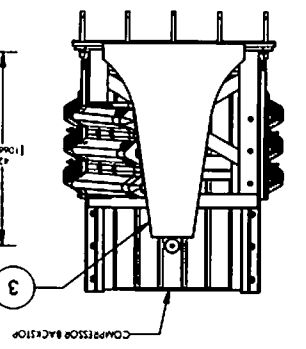
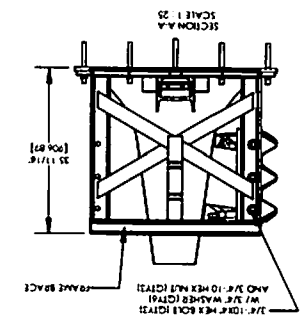
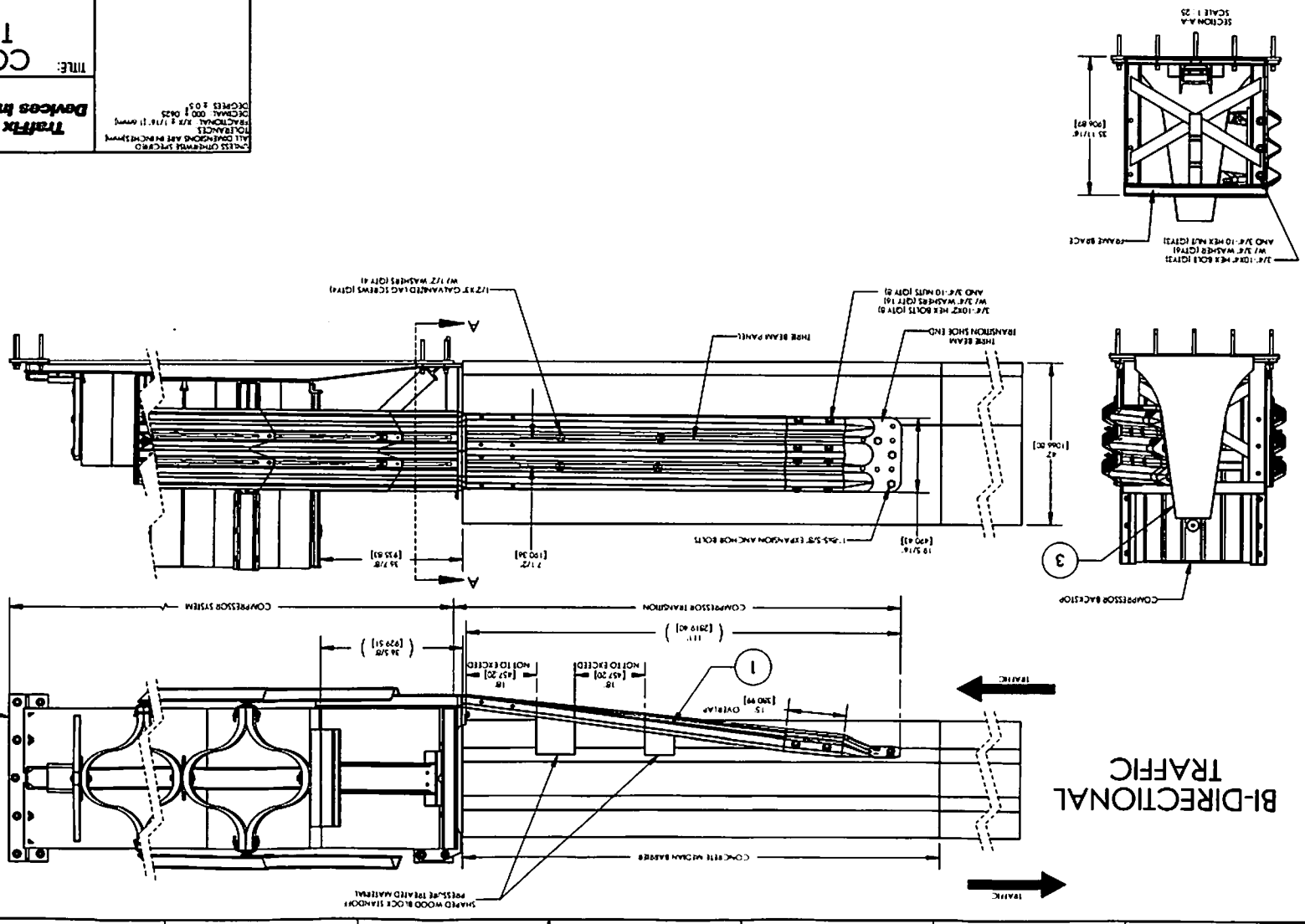
SHEET 1 OF 1

ITEM NO.	DESCRIPTION	DATE	BY
1	COMPRESSOR TRANSITION	10/09/09	DR
2	COMPRESSOR SYSTEM	10/09/09	DR
3	CONCRETE MEDIAN BARRIER	10/09/09	DR

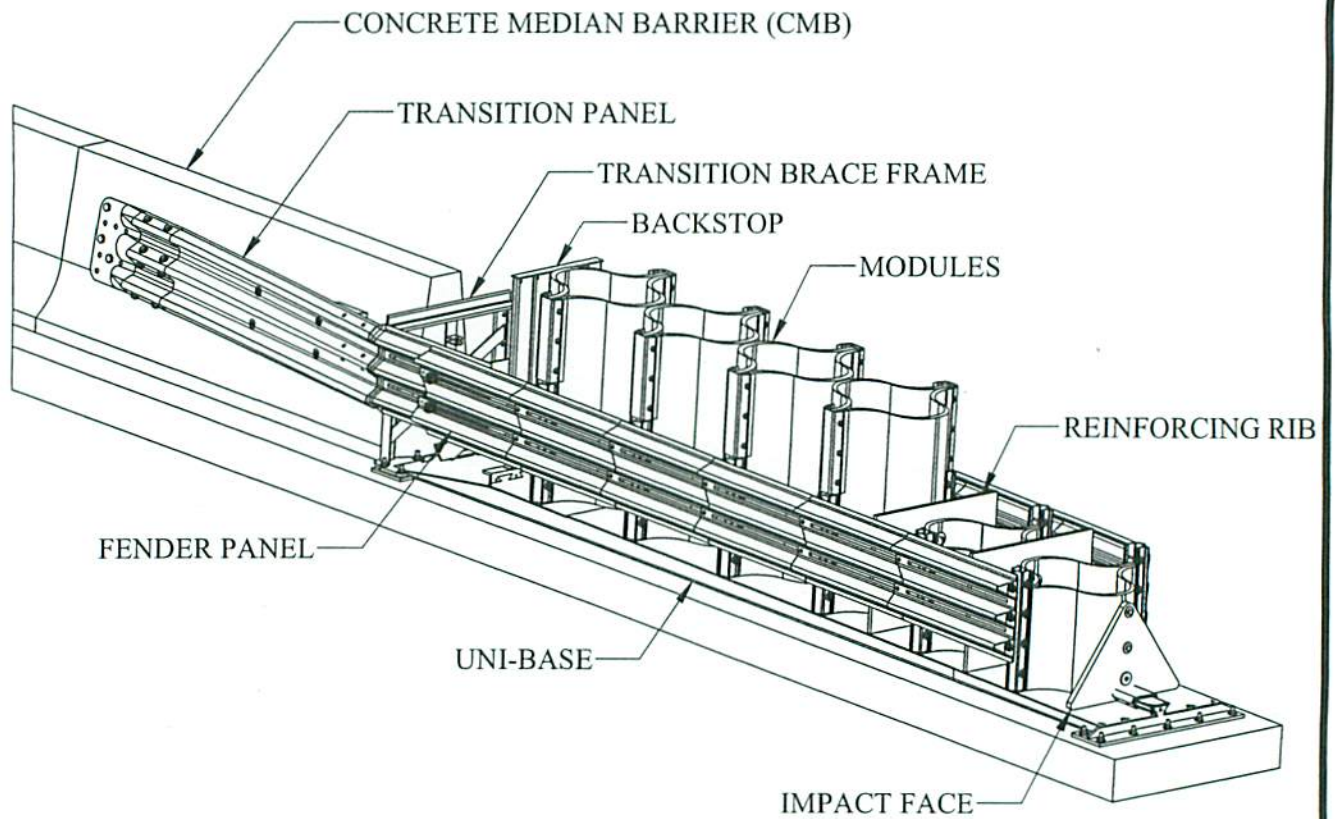
TITLE: COMPRESSOR TRANSITION DETAIL
 SIZE: B
 DWG. NO.: 647
 REV: B
 SHEET 1 OF 1

Trafik Devices Inc.
 160 Avenida La Pasa
 San Clemente, CA 92673
 (949) 381-5663
 FAX (949) 381-8205
 WWW.DEVICES.COM

ALL DIMENSIONS ARE PRECISE
 UNLESS OTHERWISE SPECIFIED
 TOLERANCES
 FRACTIONAL 1/8" & 1/16" (1.0mm)
 DECIMAL .001 & .0025
 ANGLES 2.0°



BI-DIRECTIONAL TRAFFIC
 TRAFFIC ←
 TRAFFIC →



COMPRESSOR SYSTEM



SCI##

SHEET NO.

DATE:

1 OF 2

10/12/09

INTENDED USE

The Compressor™ System is a low maintenance/self restoring crash cushion designed to shield hazardous objects up to 3' [914 mm] in width. The Compressor contains an array of six plastic module elements. Each Module Element contains an attached three beam designed fender panel. Linking the plastic modules with fender panels provides a highly effective re-directive, non-gating reusable crash cushion.

The Compressor™ Modules incorporate an engineered varying wall thickness. Maximum thickness is at the spine, and at the outboard mounting flange. Minimum thickness is at the appropriate midpoint of the module curvature. This varying wall thickness creates a highly efficient crash cushion.

The six Module Elements are bolted directly to each other and are contained on the structural Uni-Base™ dove tail. The Uni-Base is a boxed steel base design, which anchors directly to existing concrete.

The Compressor System components come completely assembled on the Uni-Base. The Compressor is a completely self contained system which does not require mounting to an existing concrete back-up.

-Non-gating
-Re-directing
-Low Maintenance/Self Restoring

Length: 21ft [6.4 m]
Width: 48" [533 mm]
Design Speed 62.1 mph [100 kph]

ACCEPTANCE

CONTACT INFORMATION

TraFFix Devices, Inc.
Corporate Headquarters
160 Avenida La Pata
San Clemente, CA 92673
www.traffixdevices.com

Phone: +1(949)-361-5663
Fax: +1(949)-361-9205
Email: info@traffixdevices.com

COMPRESSOR SYSTEM

SCI##

SHEET NO.

DATE:

2 OF 2

10/12/09

**TraFFix
Devices Inc.**



DATA SHEET 4
SUMMARY OF RESULTS

Test Article: TraFFix Devices Compressor
 Test Program: NCHRP 350 3-39
 Test Vehicle: 1999 Chevrolet 2500

Project No.: P29055-01
 Test Date: 03/27/09



GENERAL INFORMATION		OCCUPANT RISK VALUES	
TEST AGENCY	KARCO Engineering, LLC	FLAIL SPACE VELOCITY (m/sec)	
TEST NO.	3-39	X DIRECTION	5.9
DATE	3/27/2009	Y DIRECTION	6.2
TEST ARTICLE		THIV (Optional)	N/A
TYPE	Narrow Crash Cushion	RIDEDOWN ACCELERATION (g's)	
INSTALLATION LENGTH	15.8 m	X DIRECTION	-5.1
SIZE AND/OR DIMENSION OF KEY ELEMENTS	6.48 m long x 1.10 m wide	Y DIRECTION	7.2
SOIL TYPE AND CONDITION	Concrete	PHD (Optional)	N/A
TEST VEHICLE		ASI (Optional)	N/A
TYPE	Production Model	TEST ARTICLE DEFLECTIONS (m)	
DESIGNATION	2000P	DYNAMIC	96 mm
MODEL	1999 Chevrolet 2500	PERMANENT	Unavailable
MASS (CURB)	2140.5 (4719 lbs)	VEHICLE DAMAGE	
MASS (TEST INERTIAL)	2026.0 (4467 lbs)	EXTERIOR	
DUMMY MASS	0 kg (0 lbs)	VDS	11-FL-4
MASS (GROSS STATIC)	2026.0 (4467 lbs)	CDC	11FLHS2
IMPACT CONDITIONS		INTERIOR	
VELOCITY (km/h)	101.7 (63.2 mph)	OCDI	FS011200
ANGLE (°)	20.5	POST-IMPACT VEHICULAR BEHAVIOR	
IMPACT SEVERITY (kJ)	808.7	MAXIMUM ROLL ANGLE (°)	13.2
EXIT CONDITIONS		MAXIMUM PITCH ANGLE (°)	4.2
VELOCITY (km/h)	73.5 (45.7 mph)	MAXIMUM YAW ANGLE (°)	-22.9
ANGLE (°)	2.7		