

Mr. Greg Hannah
Impact Recovery Systems
246 West Josephine Street
P.O. Box 12637
San Antonio, TX 78212

Dear Mr. Hannah:

This is in response to your letter of December 3, 2002, requesting Federal Highway Administration (FHWA) acceptance of your company's Flexible Traffic Control Products with an Empco Lite as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter were reports of crash testing conducted by Karco Engineering and video of the tests. You requested that we find these devices 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."

Introduction

The FHWA guidance on crash testing of work zone traffic control devices is contained in two memoranda. The first, dated July 25, 1997, titled "INFORMATION: Identifying Acceptable Highway Safety Features," established four categories of work zone devices: Category I devices were those lightweight devices which could be self-certified by the vendor, Category II devices were other lightweight devices which needed individual crash testing, Category III devices were barriers and other fixed or massive devices also needing crash testing, and Category IV devices were trailer mounted lighted signs, arrow panels, etc. The second guidance memorandum was issued on August 28, 1998, and is titled "INFORMATION: Crash Tested Work Zone Traffic Control Devices." This later memorandum lists devices that are acceptable under Categories I, II, and III.

A brief description of the devices follows:

Test Article 1: 12 inch x 48-inch Double sided Vertical Panel with No. 103QR Portable One Base and Light. The Portable One Base is solid recycled rubber measuring 355 mm (14 inches) wide by 864 mm (34 inches) long and weighing 22 kg (48 pounds). The vertical panel consists of a 60.3 mm (2 3/8 inch) diameter, 1220 mm tall (48 inch) polyethylene plastic tube. To the front and back of the tube are attached 305 mm (12 inch) by 1220 mm (48 inch) tall vertical panels.

They are attached to the tube using standard grad 3/8 inch x 2 3/4 inch carriage bolts with tee nuts and plastic washers.

Test Article 2: 24 inch x 36 inch Directional Indicator Barricade with 103QR Portable One base and Light. The Portable One Base is as described above. The Directional Indicator Barricade also consists of a polyethylene tube as described above except at a height of 890 mm (35 inches). To it is attached a single 610 mm (24 inch) tall by 914 mm (36 inch) wide directional panel.

Testing

Full-scale automobile testing was conducted on your company' devices. One stand-alone example of each device were tested in tandem, one head-on and the next placed six meters downstream turned at 90 degrees, as called for in our guidance memoranda. Because the basic structure is the same and both have been previously accepted without warning lights attached, this single test is appropriate for assessing their crashworthiness. The automobile exceeded the tolerance for the 820C vehicle called for in NCHRP Report 350. Again, in this case we will accept that because this is a re-test of the device, using lights.

The tests are summarized in the table below.

Test Number	P22144-01	
Device Tested	12x48 Vertical Panel	24x36 Directional
Weight of Tested Article	22 kg (48 pounds)	22 kg (48 pounds)
Mounting heights	1220 mm (48 inches)	914 mm (36 inches)
Flags? Lights?	Empco Lite 400T, Type A&C	Empco Lite 600T Type D
Mass of Test Vehicle	962.34 kg	
Impact Speed	97.02 km/h	96.98 km/h
Velocity Change	Negligible	N/a
Extent of contact	Grille, hood, windshield, roof	Grille, hood, windshield
Windshield Damage	Minor cracking from impacts with lights, no holes nor deformation	
Other notes		

Findings

Damage was limited to sheet metal damage and minor cracking of the windshield. The cracking was due to the impact of the plastic lens of the warning light. The glass did not deform nor was a hole caused by the impact. As the performance of the conventional Type A and C warning light was comparable to the omni directional Type D light, these two lightweight warning lights may be used interchangeably on these devices. The results of the testing met the FHWA requirements and, therefore, the devices described in the various requests above and detailed in the enclosed drawings are acceptable for use on the NHS under the range of conditions tested, when proposed by a State.

In a letter dated December 3, 2002, you also asked us to consider the use of warning lights atop your type III barricades. These plastic barricades were the subject of our letter to you, WZ-110, dated March 22, 2002. Because the top of the barricade struck the test vehicle in the lower part of the windshield causing light to moderate cracking, we expect that the addition of a light would cause additional damage. Unfortunately, we are not able to estimate how severe the damage would be in the head-on test. Therefore, we must recommend that these barricades be crash tested with lights in place before we can take action.

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

- Our 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, it reserves the right to modify or revoke its 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 they will meet the crashworthiness requirements of FHWA and NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number WZ-140 shall not be reproduced except in full. This letter, and the test documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.
- Impact Recovery Systems devices may include patented components and if so are considered "proprietary." The use of proprietary work zone traffic control devices in Federal-aid projects is generally of a temporary nature. They are selected by the contractor for use as needed and removed upon completion of the project. Under such conditions they can be presumed to meet requirement "a" given below for the use of proprietary products on Federal-aid projects. On the other hand, if proprietary devices are specified 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

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, a copy of which is enclosed.

Sincerely yours,

Michael S. Griffith
Acting Director, Office of Safety Design
Office of Safety

2 Enclosures

FHWA:HSA-10:Nartimovich:x61331:2/26/03
cc: Reader-HSA-1, HAS-10(Chron File, Nartimovich)
h:directoryfolder/nartimovich/wz140ImpactRecoveryFIN

Sec. 635.411 Material or product selection.

(a) Federal funds shall not participate, directly or indirectly, in payment for any premium or royalty on any patented or proprietary material, specification, or process specifically set forth in the plans and specifications for a project, unless:

(1) Such patented or proprietary item is purchased or obtained through competitive bidding with equally suitable unpatented items; or

(2) The State highway agency certifies either that such patented or proprietary item is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or

(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable on the basis of engineering analysis and the anticipated prices for the related item(s) of work are estimated to be approximately the same, the PS&E for the project shall either contain or include by reference the specifications for each such material or product that is considered acceptable for incorporation in the work. If the State highway agency wishes to substitute some other acceptable material or product for the material or product designated by the successful bidder or bid as the lowest alternate, and such substitution results in an increase in costs, there will not be Federal-aid participation in any increase in costs.

(c) A State highway agency may require a specific material or product when there are other acceptable materials and products, when such specific choice is approved by the Division Administrator as being in the public interest. When the Division Administrator's approval is not obtained, the item will be nonparticipating unless bidding procedures are used that establish the unit price of each acceptable alternative. In this case Federal-aid participation will be based on the lowest price so established.

(d) Appendix A sets forth the FHWA requirements regarding (1) the specification of alternative types of culvert pipes, and (2) the number and types of such alternatives which must be set forth in the specifications for various types of drainage installations.

(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.

DIAGRAMS
TEST NO. 1

2 3/8" ϕ Guy
11"

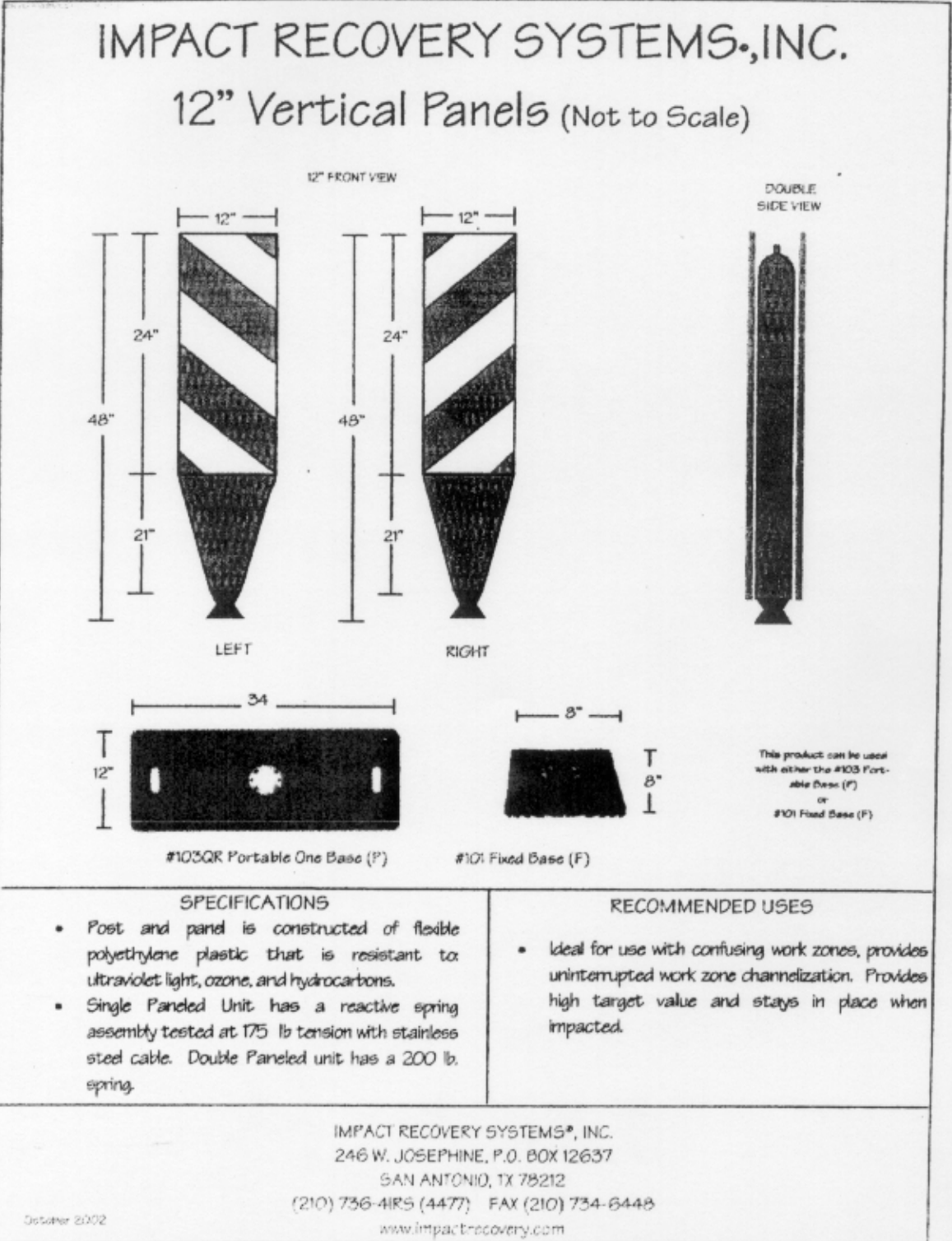
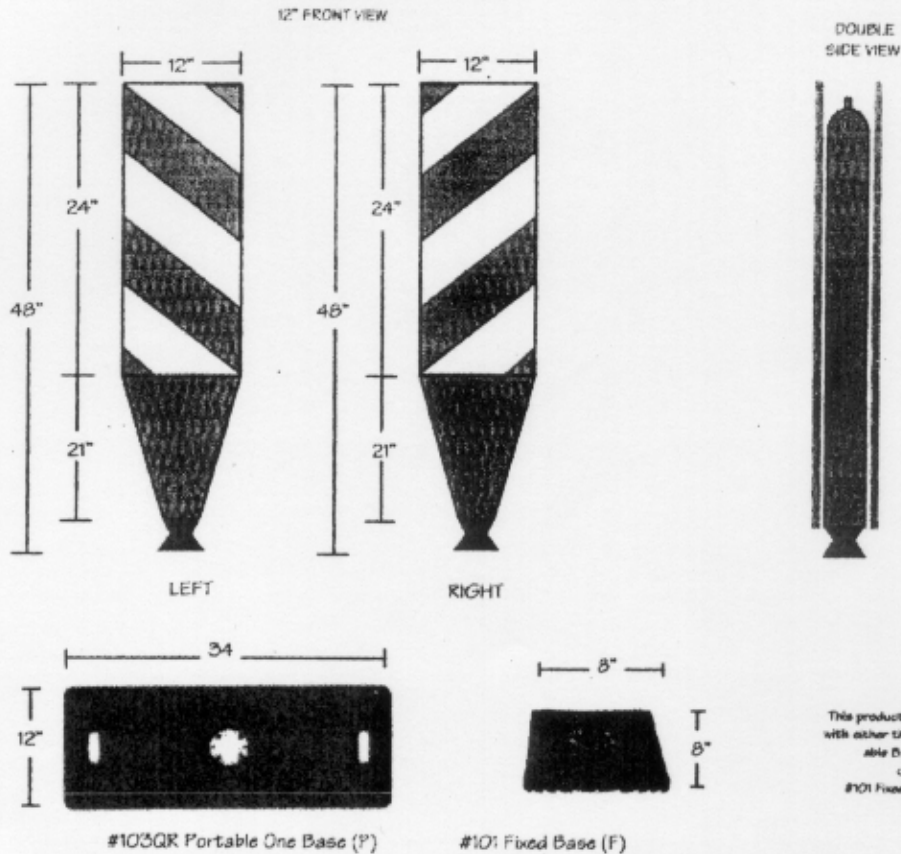


FIGURE 1 -12-Inch by 48-Inch Double-sided Vertical Panel with #103QR Portable One Base and Light.

DIAGRAMS
TEST NO. 1

2 3/8" ϕ 6' 11"

IMPACT RECOVERY SYSTEMS, INC.
12" Vertical Panels (Not to Scale)



SPECIFICATIONS

- Post and panel is constructed of flexible polyethylene plastic that is resistant to ultraviolet light, ozone, and hydrocarbons.
- Single Panded Unit has a reactive spring assembly tested at 175 lb tension with stainless steel cable. Double Panded unit has a 200 lb. spring.

RECOMMENDED USES

- Ideal for use with confusing work zones, provides uninterrupted work zone channelization. Provides high target value and stays in place when impacted.

IMPACT RECOVERY SYSTEMS®, INC.
246 W. JOSEPHINE, P.O. BOX 12637
SAN ANTONIO, TX 78212
(210) 736-4185 (4477) FAX (210) 734-6448
www.impactrecovery.com

October 2002

FIGURE 1 -12-Inch by 48-Inch Double-sided Vertical Panel with #103QR Portable One Base and Light.