

Refer to: HSA-10/WZ-135

Mr. Marc Christensen
Off the Wall Products, LLC
P.O. Box 1461
Salt Lake City, UT 84110-14461

Dear Mr. Christensen:

Thank you for your letters of June 14, August 16, and December 17, 2002, requesting Federal Highway Administration (FHWA) acceptance of your company's water-filled longitudinal channelizers as crashworthy traffic control devices for use in work zones on the National Highway System (NHS). Accompanying your letter was a report of crash testing conducted by E-Tech Testing Services, summaries of additional tests, drawings of the individual units, and videos 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." On March 12, 2003, you provided a complete final report covering the crash testing of the device as a longitudinal channelizer.

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:

The Multi-Barrier is a rotation molded hollow plastic barricade section, which can accept water ballast. Each high-impact, UV-resistant polyethylene section is 1219 mm (48 inches) tall and 1016 mm (40 inches) long. Each section is 598 mm (23.5 inches) wide at the base, tapering on one side to a top width of 152 mm (6 inches). The wall thickness is 5.1 mm (0.20) inches, and one section weighs 22.7 kg (50 pounds) empty. The specifications and drawings are given in the enclosed literature for reference.

Individual units were crash tested as Type II barricades, and found acceptable in FHWA Acceptance Letter WZ-8 date February 5, 1999. This action, WZ-135, is to qualify the same units linked longitudinally and filled with water, deployed as a Test Level-1 (TL-1) longitudinal channelizer.

Testing

Full-scale automobile testing was conducted on your company's devices. The crash test matrix was a modification of both the NCHRP Report 350 tests for longitudinal barriers and work zone traffic control devices. The crash tests are summarized in the table below:

Test Number	10-9718-002	10-9718-003
NCHRP 350 Test #	1-10 (Pick Up Truck)	1-11 (Small Car)
Test Article	Off-The-Wall Multi-Barrier	
Length of test article	30 Sections (30.5 m, 100 ft)	30 Sections (30.5 m, 100 ft)
Mass of individual units	22.7 kg (50 pounds)	22.7 kg (50 pounds)
Mass of water ballast	418 kg (921 pounds)	418 kg (921 pounds)
Vehicle inertial mass	2011 kg (4433 pounds)	826 kg (1820 pounds)
Impact speed	51.25 km/h (31.8 mph)	49.16 km/h (30.5 mph)
Impact angle	25.0 degrees	20.2 degrees
Occupant impact speed	4.78 m/s	6.78 m/s
Ridedown acceleration	-3.45 g's	-3.77 g's
Trajectory	Vehicle penetrated, stopped	Vehicle penetrated system
Vehicle damage	Minor, to grill and hood	Minor, to grill and hood
Occup. compartment intrusion	None	None
Windshield damage	No Contact	No Contact

Findings

As expected the vehicle penetrated the installation. The occupant impact velocity of the small car exceeded that for a work zone traffic control device, but the occupant impact velocities and accelerations in both tests were within those specified for a barrier.

The results of the testing met the unique requirements established for water-filled longitudinal channelizers and, therefore, the device described above and shown in the enclosed drawings for reference are acceptable for use on the NHS under the range of conditions tested (Report 350 TL-1), when proposed by a State or other highway agency.

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-135 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.
- The Multi-Barrier is a patented device and is 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.
- This acceptance letter shall not be construed as authorization or consent by the Federal Highway Administration to use, manufacture, or sell any patented device. Patent issues are to be resolved by the applicant and the patent owner.

Sincerely yours,

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

Enclosures

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

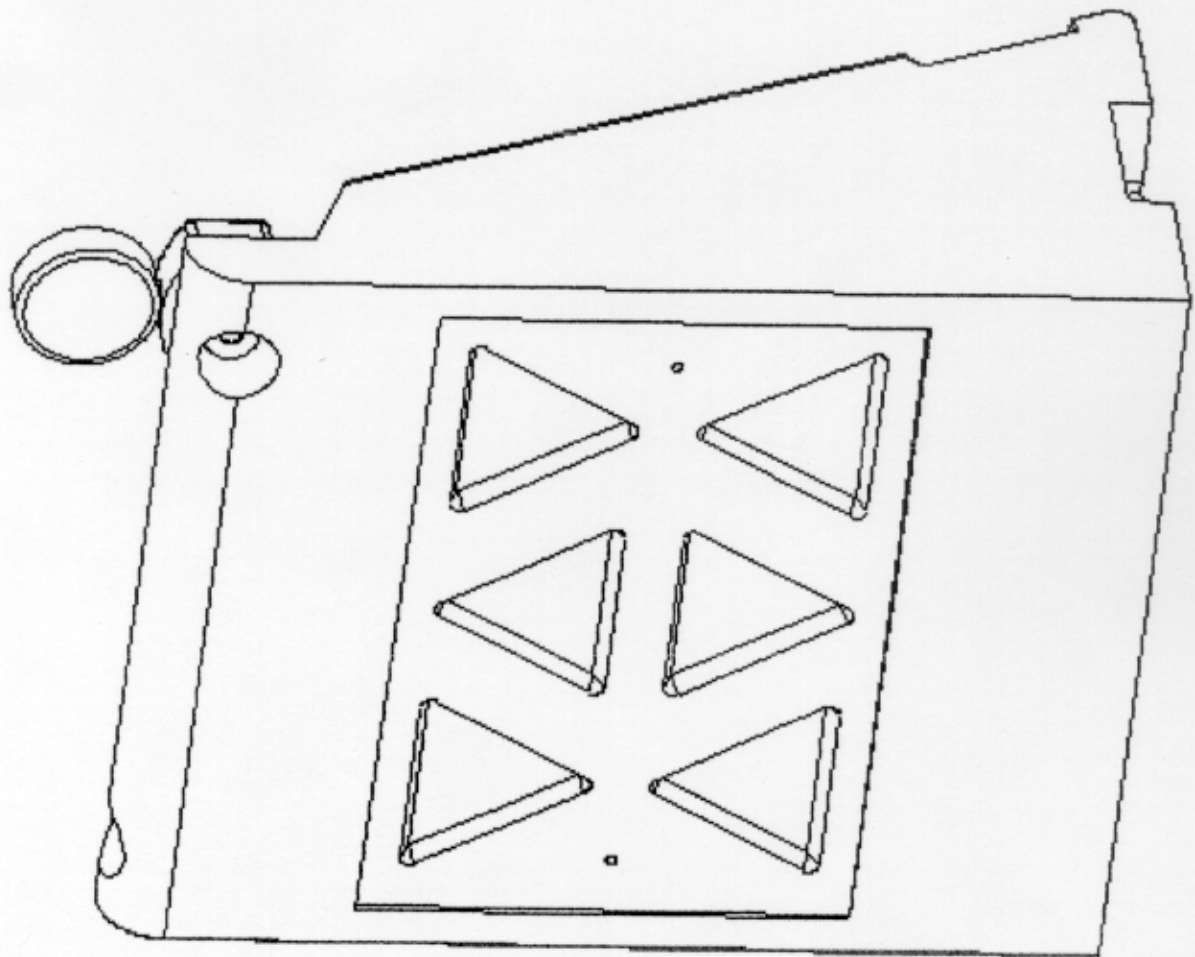
(3) Such patented or proprietary item is used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes.

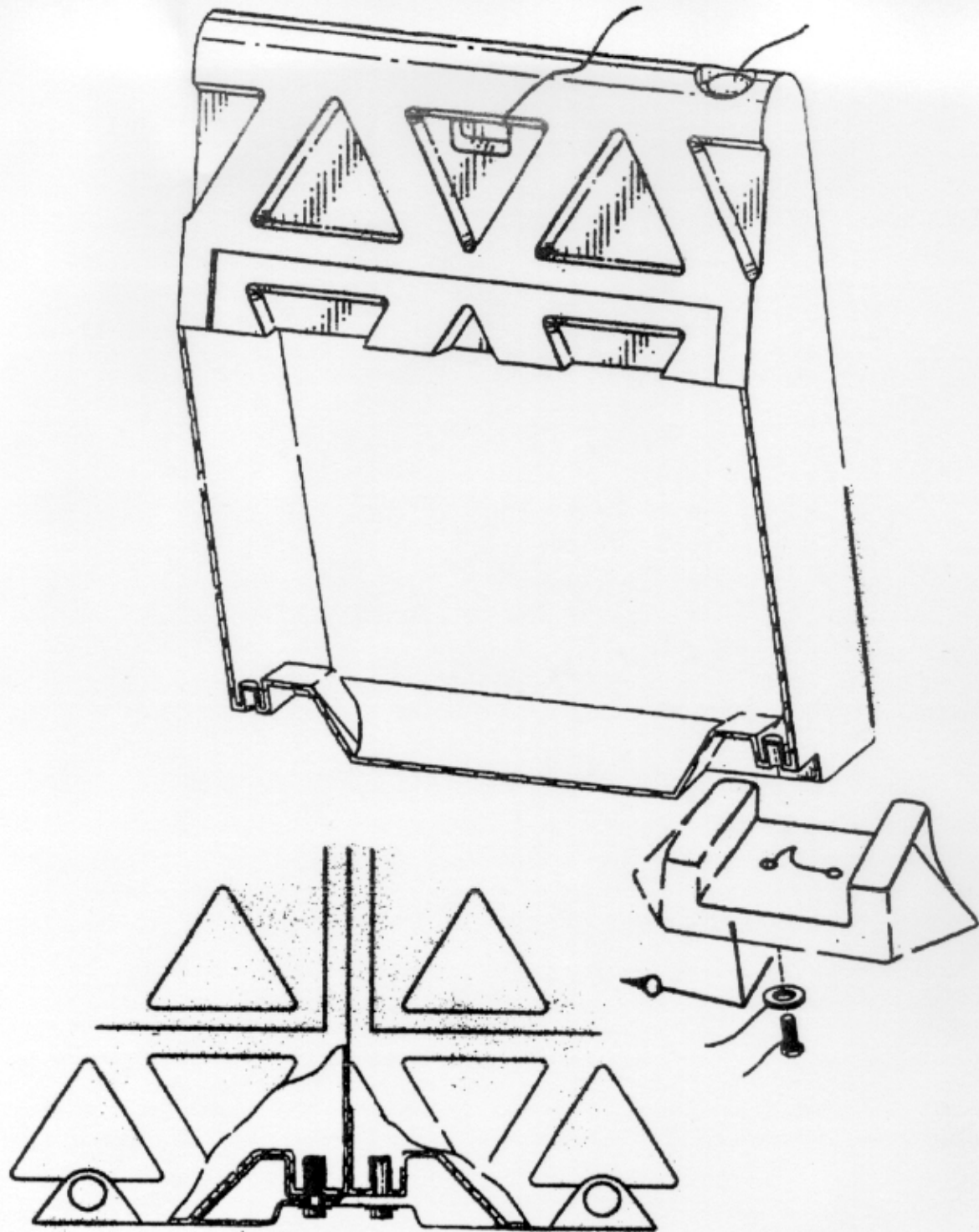
(b) When there is available for purchase more than one nonpatented, nonproprietary material, semifinished or finished article or product that will fulfill the requirements for an item of work of a project and these available materials or products are judged to be of satisfactory quality and equally acceptable 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.

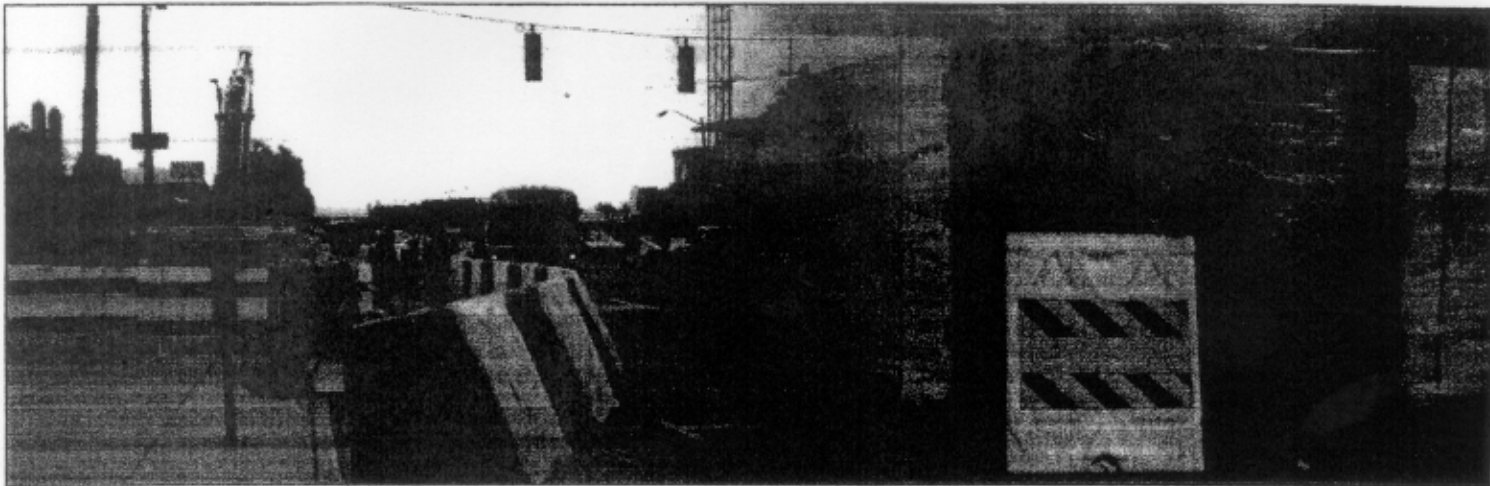
(e) Reference in specifications and on plans to single trade name materials will not be approved on Federal-aid contracts.





Multi-Barrier™

Model MB-48x40 Specification



Type:	Multi-Barrier™ Safety Barricade Model MB-48x40
Standard Colors:	Orange and White - Also available in custom colors.
Composition:	High Impact, UV-Resistant Polyethylene
Size:	Height: 48" / 1219 mm Length: 40" / 1016 mm Width: 23.50" / 6" (base/top) 598 mm / 152 mm (base/top) Wall: .20" / 5 mm Mass: 50 lbs / 22.7 kg (empty)

- Optional Accessories:**
- Stanchions can be utilized with snow fencing or barricade rail to create Type III barricades.
 - Pre-molded attachment area for flashing lights.
 - Interchangeable signage: directional, reflective, advertising
 - Display panel designed to meet MUTCD Specifications for Type I and Type II barricades.
 - U-Connector creates vandal-proof interlocking longitudinal walls.
 - Compatible with other Multi-Barrier™ models to create walls of varying height.

- Sample Generic Specification:**
- Barricade must be of resiliently deformable and non-conductive material.
 - System must be **NCHRP 350** approved.
 - System must be able to create an interconnected wall with no intermittent gaps.
 - Barricade must be fabricated in approved OSHA safety colors.
 - Barricade must be vandal-proof with the capability of positive locking in such a manner that discourages section disconnection once attached.

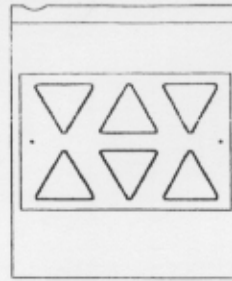
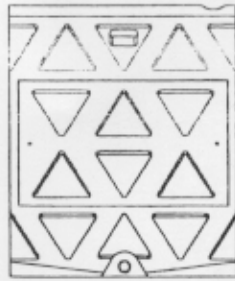
- Scope of service:**
- Rapidly deployable traffic / security barricade. Enhances security and safety in less time than constructing sandbag structures or moving concrete road barriers. Weighing only 50 pounds, the barricade can be installed manually and once positioned can be filled with over 900 pounds with water. Compatible with lights, stanchions, signage, and snow fencing.

- Performance Specifications:**
- DOT Performance Evaluations: Pass **NCHRP-350 Test 3-71**
 - FHWA Certification Letter WZ-8: Accepted Category II Traffic Control Device at 62.5 mph.
 - Application of force for tipping: Will resist a point force up to 255.8 lbs applied to top edge.

These specifications describe a Multi-Barrier™ MB-48x40 traffic control safety barricade. Equivalent traffic control safety barricades will be considered. It is the responsibility of the bidder to document and certify the equivalence of his/her product. Final determination of equivalency will be by the municipality. Use of these specifications is for the purpose of describing the standard of quality, performance and characteristics required, and is not intended to limit or restrict competition.



Model MB-48x40 Specification



Material: ISO 9000 Quality Manufactured 100% Recyclable LLDPE Polyethylene.

Physical Properties and Specifications:

Multi-Barrier products are manufactured from LLDPE (Equistar 625). LLDPE exhibits excellent environmental stress crack resistance, low temperature impact strength, and excellent UV resistance. Requires minimum fill, potassium acetate, or calcium chloride in low temperature conditions. Call for specifications.

	Test Procedure	Units	MP-625
Density	ASTM D-1505/D-4883/D-792 or ISO 1183, Method D	g/cc	0.935
Melt Index	ASTM D-1238 Condition 2.16, 190 or ISO 1133	g/10 min	5
ESCR Cond. A, F50	ASTM D-1693 100% Igepal 10% Igepal	hrs. hrs.	>1,000 350
ARM CTL. ESCR	10% Igepal	hrs.	
Flexural Modulus	ASTM D-790 at 1% Strain ISO 178	psi Mpa Mpa	87,200 600
Tensile Strength at Yield	ASTM D-638, Type IV specimen 2" per minute @ .125" thickness ISO 527-2, Type 1B	psi Mpa Mpa	2,490 17.1
Heat Distortion Temperature	ASTM D-648 66 psi (4.64 kg/cm ²) 264 psi (18.56 kg/cm ²) ISO 75-2 4.5 kg/cm ² 18.00 kg/cm ²	Celsius Celsius Celsius Celsius	52 39
ARM Low Temp. Impact, -40 C	1/4" (6.35 mm) specimen	ft. lbs. Joules	150 203
Meets FDA Requirements	Yes/No	Yes	
UV-Stabilized	Yes/No	Yes	

The information on this data sheet is, to our best knowledge, true and accurate. However, since the actual conditions of use and the specific uses of our products are beyond our control, the user necessarily assumes all risks of such use(s).

Multi-Barrier™

Model MB-48x40 Specification