April 12, 2002

HSA-10/CC52B

Mr. Dave Gertz
Director of Engineering
TrafFix Devices, Inc.
220 calle Pintoresco
San Clemente, California 92672

Dear Mr. Gertz:

In your March 12 letter to Mr. Richard Powers of my staff, you requested the Federal Highway Administration's (FHWA) approval of a change to the TrafFix Sand Barrel design that had been first accepted by my office on July 10, 1998 and modified on November 3, 1999. This first modification used the same two-piece containers for the 200, 400, and 700-pound (90, 180, and 320-kg) modules, with the 700-pound (320-kg) module filled to the top with sand. The original design required the 700-pound (320-kg) module to be inverted and filled to one inch (25 mm) from the top with sand. Your current request asked for acceptance of a change in the materials specifications and the manufacturing process of these two-piece barrels. These barrels would now be made by injection molding with polypropylene, rather than by rotational molding (rotomolding) with polyethylene. The two larger single-piece barrels will continue to be rotomolded using high-density polyethylene. Product and manufacturing specifications for these proposed change to the TrafFix Devices sand barrels are enclosed.

To verify performance of the modified design, you conducted National Cooperative Highway Research Program (NCHRP) Report 350 test 3-30, a head-on impact at a nominal speed of 100 km/h with a small car. Crash performance was nearly identical to previous tests and all evaluation criteria were satisfactorily met. However, the vehicle used in the test exceeded the upper weight tolerance recommended in NCHRP Report 350 by approximately 50 kg. My staff has advised me that the heavier vehicle would not have been acceptable for use in a certification test, but because the purpose of the test was to demonstrate the fracture characteristics of the new design and the occupant impact velocity and the ridedown accelerations were below the *preferred* Report 350 evaluation criteria and significantly lower than the *allowable maximum* values, I am willing to accept the test results with the heavier vehicle. My staff also noted that the report does not identify or describe the changes you made in your manufacturing process that required the test. This information is contained only in your cover letter. Please be advised that any future reports that do not include the minimum information described in Chapter 6 (Test Documentation) of NCHRP Report 350 will be returned without action. In spite of these shortcomings, your requested manufacturing change is considered acceptable and the new injection-molded combination TrafFix Sand Barrels may be used in sand barrel arrays on the National Highway System.

As with all FHWA acceptance letters, this acceptance is based on the reported crash test performance of the new design and does not address the long-term durability of your product. We assume that adequate quality control procedures will remain in effect to ensure that the

barrels sold remain similar to those that were tested. As part of that quality control, we expect continued surveillance of the performance of your new product under field conditions as part of an informal in-service evaluation to ensure that there are no long-term problems associated with either the new material or with the new manufacturing process.

Sincerely yours,

(original signed by A. George Ostensen)

A. George Ostensen
Program Manager, Safety

Enclosure

Form No. 1050	**PRODUCT SPECIFICATIONS** **TrafFix Devices Sand Barrel**	Approval Date 3/14/12

1. SCOPE

1.1 Product – These specifications describe a plastic barrel which is filled with sand and used in arrays for providing vehicle crash cushions. The barrels are covered by a plastic lid and have a lifting flange for purposes of attaching a lifting ring to move the barrels. Three separate barrels are available. The largest holds 2,100 lbs. (960 kg.); the second largest holds 1,400 lbs. (640 kg.). And the third can be filled to 700 lbs. (320 kg.), 400 lbs. (180 kg.) and 200 lbs. (90 kg.) The third size barrel is assembled in the field by locking two different sizes of half-barrels together and filling to one of three different fill heights as marked on the barrel.

2. PRODUCT SPECIFCATIONS

2.1 Construction – The combination barrel (700, 400, or 200 lbs.) will be injection molded, and the 1400 lb. and 2100 lb. barrels will be rotomolded. Molding process parameters will not be changed from those that were used for certification testing.

2.2 Materials – The combination barrel will be manufactured from polypropylene plastic (.905 g/cm). The plastic will be UV stabilized with a hindered-amine light stabilizer. Barrels will be manufactured with a three layer structure, having the inner layer foamed using a chemical blowing agent, and the outer and inner layers will be colored yellow with 20 g/kg. yellow colorant.

The 1400 lb. and 2100 lb. barrels will be manufactured from high-density polyethylene plastics (.948 g/cm.). The plastic will be UV stabilized with 7.1 g/kg. Hindered-amine light stabilizer. Barrels will be manufactured with a three layer structure, having the inner layer foamed using a chemical blowing agent, and the outer and inner layers will be colored yellow with 20 g/kg. of dry blend yellow colorant.

2.3 A. Part #48247SI	200-700 lb. (90-320 kg.)	Capacity	wt = 24 ± 1 lb. (10.9 kg. ±. 5kg.)
B. Part #48247PI	Base Support		wt = 29 ± 1 lb. (13.2 kg. ± .5 kg.)
C. Part #48140	1,400 lb. (640 kg.)	Capacity	wt = 23 ± 1 lb. (10.4 kg. ± .5 kg.)
D. Part #48210	2,100 lb. (960 kg.)	Capacity	wt = 29 ± 1 lb. (13.2 kg. ± .5 kg.)

2.4 Test – All barrels will be Q.C. tested for part weight, color, thickness, drain holes, and lid fit.

2.5 Warranty – Each plastic barrel will come with a five-year, pro-rated repair or replacement warranty against U.V. weathering degradation.

Form No. 4015	**MANUFACTURING SPECIFICATIONS TRAFFIX DEVICES SAND BARREL**	Approval Date

1. **Processing Procedures Combination Barrels** – The injection molding cycle that has been established (Proprietary) will not be altered in time, temperature or pressure.

   A. Wall thickness will be maintained with an average thickness of 6.5mm. Wall section will consist of three layers, unfoamed inner and outer layer, will be 2mm., foamed core will be 2.5 mm.

2. Processing Procedure 1400 and 2100 lb. Barrels

   A. Aluminum mold will be prepared with mold release on a regular basis to prevent dimensional changes in the Sand Barrels.

   B. Top rim circumference will measure 2.95m. ± .1m. such that all ids will fit on all barrels.

   C. Uniform wall thickness will be maintained with an average thick ness of 7mm. Wall section will consists of three layers. Unfoamed inner and outer layer will be 1.5mm. foamed core will be 4mm.

   D. All barrels will be drilled with 6mm. Drainage holes and contains six strips of butyl caulk for adhering the two half barrels together.

3. **Materials** – The combination barrel will be manufactured from polypropylene with the following specifications:

A. Density	0.905 g/cm³
B. Melt Index	20 g/min.
C. Flex Modules	220,000 psi.
D. Notched Izod	0.50 ft.-lb./in.

4. Materials – The 1400 and 2100 lb. sand barrels will be manufactured from High Density Polyethylene plastic with the following specifications:

A. Density	0.948 g/cm³
B. Melt Index	80 g/min.
C. Flex Modules	1,102 M.Pa
D. Tensile Strength	22.4 M.Pa
E. Heat Distortion Temp.	72°Celsius
F. Low Temp Imp - 40° Celsius	135.58 joules
G. UV Stabilized (Compounded)	1.7 g/Kg.
H. Yellow Color (dry blend)	20 g/Kg.

5. **Weights** – All sand barrels will be manufactured with the following part weights:

A. Part #48247-SI	90-320 Capacity	wt = 10.9 kg. ± 5 kg.
B. Part #48247-PI	Base Support	wt = 13.2 kg. ± 5 kg.
C. Part #48140	640 Capacity	wt = 10.4 kg. ± .5 kg.
D. Part #48210	960 Capacity	wt = 13.2 kg. ± .5 kg.

6. **Tests** – The following test will be performed for Q.A. verification.

   A. Pendulum arm impact test
   B. U.V. Weathering (ASTM D 4329)