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

December 15, 2005

400 Seventh St., S.W.
Washington, D.C. 20590

In Reply Refer To: HSA-10/CC-52C

Mr. Felipe Almanza
Staff Engineer
TrafFix Devices, Inc.
220 Calle Pintoresco
San Clemente, CA 92672-7505

Dear Mr. Almanza:

In your November 14, 2005, letter to Mr. Richard Powers of my staff, you requested the Federal Highway Administration's (FHWA) approval of a change to the two-piece TrafFix Sand Barrel module that had been first accepted by my office on July 10, 1998, and modified on November 3, 1999. Your current request asked for acceptance of an alternative material specification and manufacturing process for these two-piece barrels. Specifically, these barrels would be made with high-density polyethylene (HDPE) using an injection molding process. Product and manufacturing specifications for these proposed change to the TrafFix Devices sand barrels are enclosed. I understand that some two-piece barrels will continue to be manufactured using the rotational molding (rotomolding) process and that the two larger single-piece barrels will continue to be rotomolded using high-density polyethylene.

To verify performance of the modified design, you conducted the National Cooperative Highway Research Program Report 350 test 3-40, a head-on, offset 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 as noted on the enclosed test summary sheet. Consequently, your requested manufacturing change is considered acceptable and the new two-piece, injection-molded HPDE TrafFix Sand Barrels may be used in sand barrel arrays on the National Highway System. The new two-piece barrels may be used in mixed arrays with either of your earlier two-piece models and with other manufactures' sand barrels assuming the appropriate weight of sand is used in each barrel.

As with all the 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,

John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

2 Enclosures

DATA SHEET NO. 2

SUMMARY OF RESULTS FOR TEST NO. 3-40




GENERAL INFORMATION		OCCUPANT RISK VALUES	
TEST AGENCY	KARCO ENGINEERING, llc	IMPACT VELOCITY (m/sec)	
TEST NO.	3-40	X-DIRECTION	8.0
DATE	06/08/05	Y-DIRECTION	0.7
TEST ARTICLE		THIV (optional)	
TYPE	Sand Barrel Array	RIDEDOWN ACCELERATION (g's)	
INSTILLATION LENGTH (m)		X-DIRECTION	-9.6
SIZE AND/OR DIMENSION OF KEY ELEMENTS	950 kg, 640 kg, 320kg	Y-DIRECTION	4.3
SOIL TYPE AND CONDITION	CONCRETE	PHD (optional)	
TEST VEHICLE	820C	ASI (optional)	
TYPE	PRODUCTION	TEST ARTICLE DEFLECTIONS (m)	
DESIGNATION	3-40	DYNAMIC	
MODEL	FORD FESTIVA	PERMANENT	
MASS (CURB)	805 Kg (1776 lbs)	VEHICLE DAMAGE	
MASS (TEST INERTIAL)	8080 kg (1783 lbs)	EXTERIOR	
DUMMY(s) MASS	75 Kg (165 lbs)	VDS	12FD4
GROSS STATIC WEIGHT	883 Kg (1948 lbs)	CDC	12FDMW6
IMPACT CONDITIONS		INTERIOR	
SPEED (km/h)	101.63 km/h (63.16 mph)	OCDI	FS0000000
ANGLE (Deg.)	0 deg.		
IMPACT SEVERITY (kJ)	321.96 KJ	POST-IMPACT VEHICULAR BEHAVIOR	
EXIT CONDITIONS		MAXIMUM ROLL ANGLE (Deg.)	14.7
SPEED (km/h)		MAXIMUM PITCH ANGLE (Deg.)	3.8
ANGLE (Deg.)		MAXIMUM YAW ANGLE (Deg.)	57.5

Form No. 4015	**Manufacturing Specifications** **TrafFix Devices Sand Barrels**	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, un-foamed inner and outer layer, will be 2mm. and 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. $\pm$. 1m. so that all lids will fit on all barrels.

   C. Uniform wall thickness will be maintained with an average thickness of 7mm. Wall section will consist of three layers, un-foamed inner and outer layer will be 1.5mm., and foamed core will be 4mm.

   D. All barrels will be drilled with 6mm. drainage holes and will contain six strips of butyl caulk to adhere the two half barrels together.

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

A. Density	.953 g/cc
B. Melt Index	20 g/min.
C. Flex Modulus	120,000 psi
D. Falling Dart Impact	130 ft – lb

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 Modulus	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. $\pm$ 5 Kg.
B. Part #48247-PI	Base Support	wt= 13.2 kg. $\pm$5 Kg.
C. Part #48140	640 Capacity	wt= 10.4 kg. $\pm$ 5 Kg.
D. Part #48210	960 Capacity	wt= 13.2 kg. $\pm$5 Kg.

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

   A. Pendulum Arm impact test
   B. U.V. Weathering (ASTM D 4329)
   C. Vertical Drop Impact Test