July 10, 1998

Refer to: HNG-14

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

Dear Mr. Gertz:

In your June 9 letter to Mr. Richard Powers of my staff, you requested the Federal Highway Administration (FHWA) to accept your TrafFix Devices sand barrel system as a National Cooperative Highway Research Program (NCHRP) Report 350 non-redirecting crash cushion at test level 3 (TL-3). To support this request, you included a copy of a report dated May 18, 1998, that was prepared by KARKO Engineering, entitled "Crash Test Report for TrafFix Sand Barrel Modules Tested to NCHRP 350 Recommendations for TL-3 Nonredirective Crash Cushions" and 16-mm films of the crash tests that were run. You later sent Mr. Powers a video tape of the same tests and additional drawings and material specifications upon his request.

The TrafFix Devices sand barrels are made from rotomolded high density polyethylene plastic in four sizes. The largest barrel is 1220-mm tall and will hold 950 kg of sand. The second largest is 915-mm high and will hold 640 kg of sand. The third barrel is assembled on site by locking two different sizes of half-barrels together and is also 915-mm high. In one orientation, the third barrel will hold 320 kg of sand; when inverted, it can be filled with 180 or 90 kg of sand. All modules are 900-mm wide (outside diameter) at the top and have a wall thickness of 7.62 mm. Each is covered with a plastic lid. Drawings of the three component modules and of the tested 12-module array are shown in Enclosure 1.

The NCHRP Report 350 recommends five tests for a non-redirective crash cushion, specifically, tests 3-40 through 3-44. These tests were all run and their results are summarized in Enclosure 2.

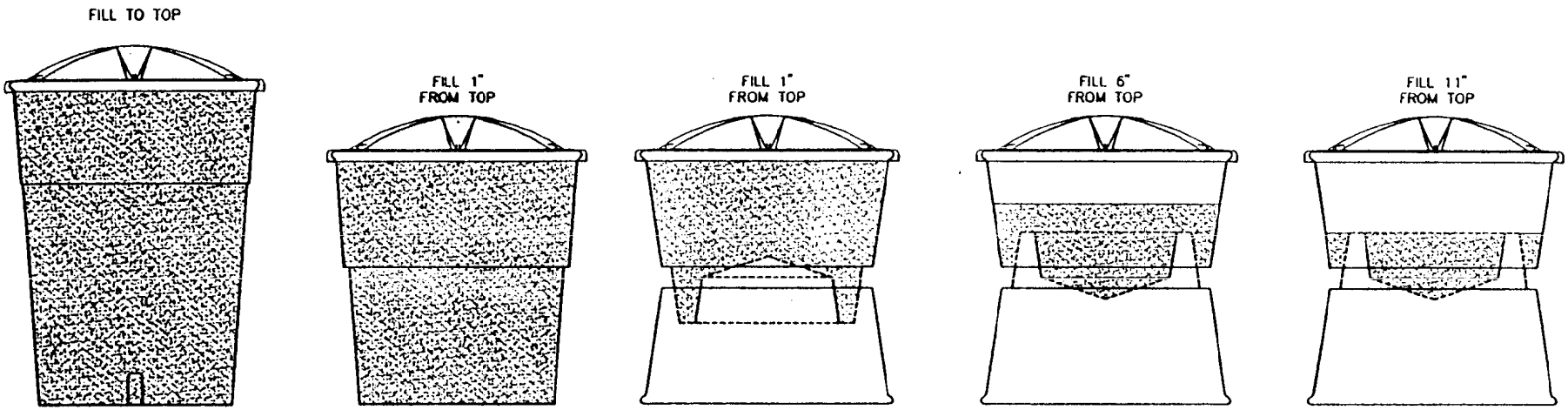
Based on our review of the information you presented, we agree that the TrafFix sand barrels, in the twelve-module array that was tested, satisfy the evaluation criteria for a TL-3 crash cushion and may be used on the National Highway System (NHS) when selected by a highway agency. This acceptance is based only on the crash performance of the tested array and the assumption that the modules you produce will be manufactured to the same dimensions and specifications as the tested modules. Since this product is patented, its use on Federal-aid projects, except exempt, non-NHS projects, is subject to the conditions listed in Title 23, Code of Federal Regulations, Section 635.411 when its use is specified by the contracting authority. Enclosure 3 is a copy of this regulation for your ready reference. Please call Mr. Powers at (202) 366-1320 if you have any questions regarding this action.

Sincerely yours,

(original signed by Dwight A. Horne)

Dwight A. Horne
Chief, Federal-Aid and Design Division

3 Enclosures
Acceptance Letter CC-52



2100 LB. 1400 LB. 700 LB. 400 LB. 200 LB.

D-1

P98019

NOTES:

Revision	Revision Description	Approved	Date
-	New part		5/19/98

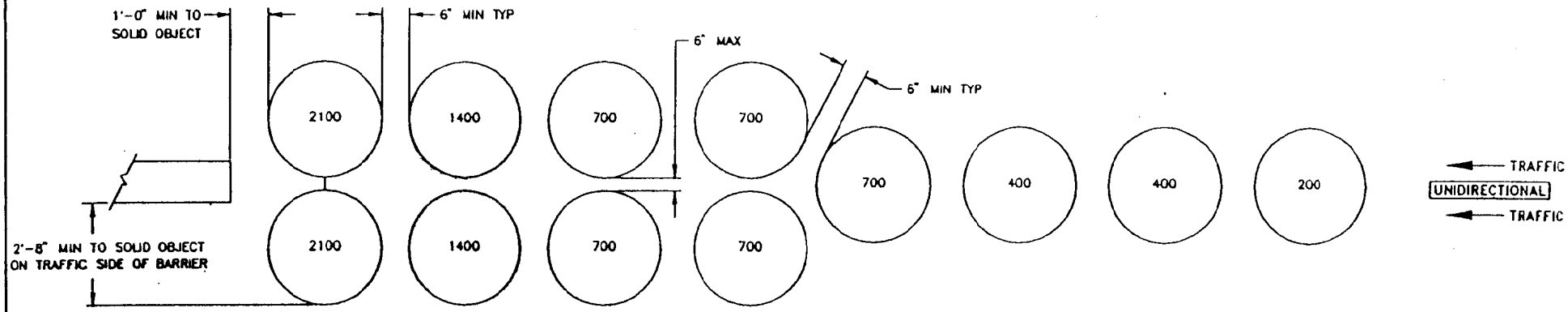
TOLERANCES UNLESS OTHERWISE SPECIFIED
DECIMALS ANGLES
.XX = ±.04 ±1/2°
.XXX = ±.010
FRACTIONS
±1/32 -0

TrafFix Devices, Inc.

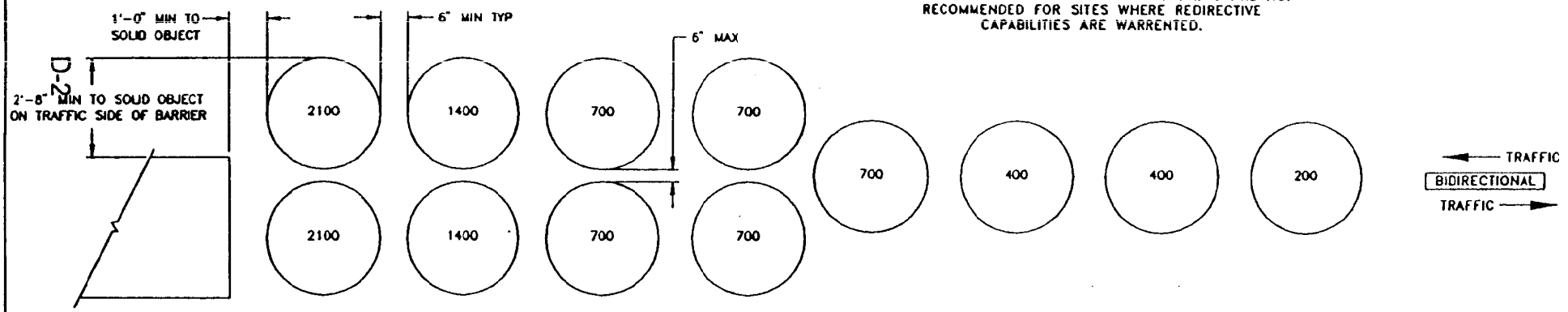
Title: BARREL WEIGHTS

Directory: | CAD File No.: BRLFILL | Drawing No.: | Rev: --

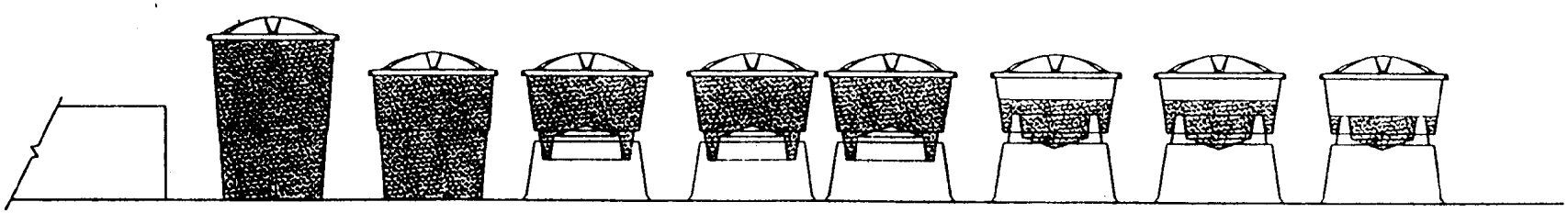
Scale: | Size: C | Sheet 1 of 1



THE FOLLOWING DEPICTION OF A 100 Km/hr ARRAY IS FOR ILLUSTRATION PURPOSES. REFER TO THE SPECIFIC STATE PLANS AND THE DESIGN MANUAL FOR PERFORMANCE SPECIFICATIONS. INERTIAL BARRIER SYSTEMS ARE NOT RECOMMENDED FOR SITES WHERE REDIRECTIVE CAPABILITIES ARE WARRENTED.



D-2



P98019

NOTES:

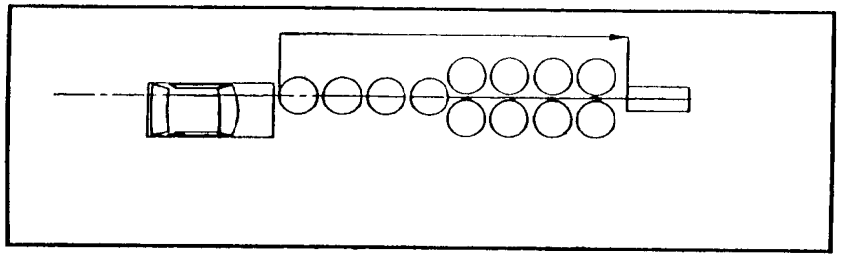
				TOLERANCES UNLESS OTHERWISE SPECIFIED
				DECIMAL ANGLE
				.XX = ± .06 ± 1/2°
				.XXX = ± .005
				FRACTIONS ± 1/32
- Revision	Rev. per	Approved	5/18/98 Date	

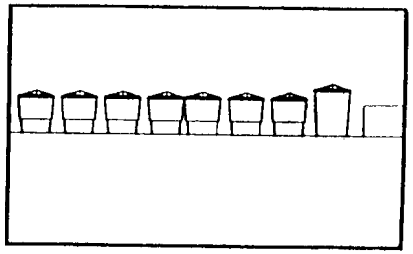
TrafFix Devices, Inc.

Title: 100 Km/hr STANDARD ARRAY

Directory	CAD File No. BRLPATRN	Drawing No.	Rev -
Scale:		Size: C	Sheet 1 of 1

DATA SHEET NO. 3
SUMMARY OF RESULTS FOR TEST NO. 3-40

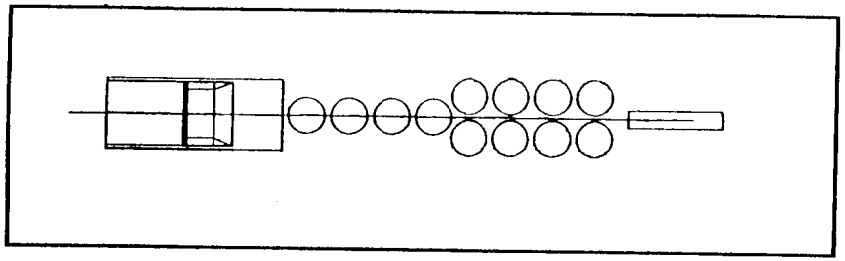


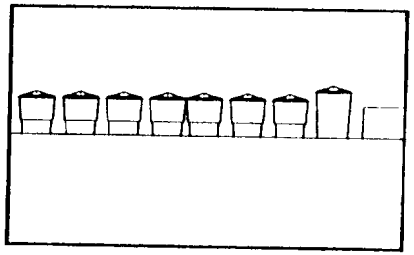


GENERAL INFORMATION	
TEST AGENCY	KARCO ENGINEERING
TEST NO.	90
DATE	4/2/98
TEST ARTICLE	
TYPE	CRASH CUSHION
INSTALLATAION LENGTH (m)	10.1 m (33.0 ft.)
SIZE AND/OR DIMENSION OF KEY ELEMENTS	VARIABLE WEIGHT MODULES
SOIL TYPE AND CONDITION	DRY SAND
TEST VEHICLE	
TYPE	PRODUCTION
DESIGNATION	820C
MODEL	FORD FESTIVA
MASS (CURB)	825 kg
MASS (TEST INERTIAL)	814 kg
DUMMY(s) MASS	75 kg
GROSS STATIC WEIGHT	889 kg
IMPACT CONDITIONS	
SPEED (km/h)	103.1
ANGLE (Deg.)	0
IMPACT SEVERITY (kJ)	333.9
EXIT CONDITIONS	
SPEED (km/h)	14.4
ANGLE (Deg.)	158

OCCUPANT RISK VALUES	
IMPACT VELOCITY (m/sec)	
X-DIRECTION	9.39
Y-DIRECTION	0.12
THIV (optional)	N/A
RIDEDOWN ACCELERATION (g's)	
X-DIRECTION	-15.38
Y-DIRECTION	6.89
PHD (optional)	N/A
ASI (optional)	0.880
TEST ARTICLE DEFLECTIONS (m)	
DYNAMIC	N/A
PERMANENT	N/A
VEHICLE DAMAGE	
EXTERIOR	
VDS	
CDC	
INTERIOR	
OCDI	
POST IMPACT VEHICULAR BEHAVIOR	
MAXIMUM ROLL ANGLE (Deg.)	-8.77
MAXIMUM PITCH ANGLE (Deg.)	-8.31
MAXIMUM YAW ANGLE (Deg.)	-158.27

DATA SHEET NO. 6
SUMMARY OF RESULTS FOR TEST NO. 3-41

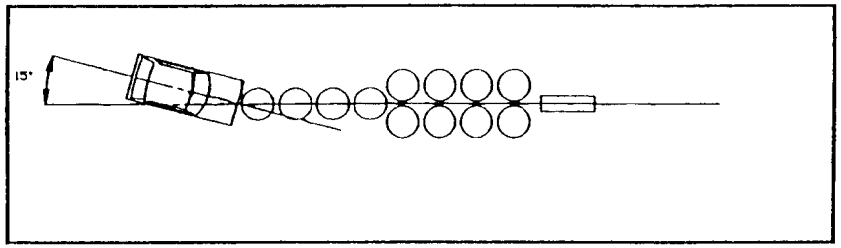


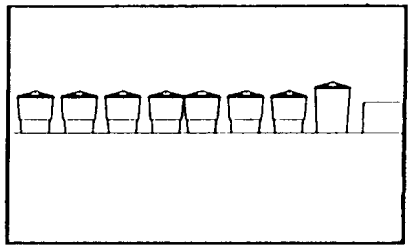


GENERAL INFORMATION	
TEST AGENCY	KARCO ENGINEERING
TEST NO.	90
DATE	4/8/98
TEST ARTICLE	
TYPE	CRASH CUSHION
INSTALLATAION LENGTH (m)	10.1 m (33.0 ft)
SIZE AND/OR DIMENSION OF KEY ELEMENTS	VARIABLE WEIGHT MODULES
SOIL TYPE AND CONDITION	DRY SAND
TEST VEHICLE	
TYPE	PRODUCTION
DESIGNATION	2000P
MODEL	CHEVROLET CHEYENE 2500
MASS (CURB)	2076 kg
MASS (TEST INERTIAL)	2098 kg
DUMMY(s) MASS	N/A
GROSS STATIC WEIGHT	2098 kg
IMPACT CONDITIONS	
SPEED (km/h)	96.7 km/h
ANGLE (Deg.)	0
IMPACT SEVERITY (kJ)	738.2
EXIT CONDITIONS	
SPEED (km/h)	2
ANGLE (Deg.)	0

OCCUPANT RISK VALUES	
IMPACT VELOCITY (m/sec)	
X-DIRECTION	7.11
Y-DIRECTION	0.26
THIV (optional)	N/A
RIDEDOWN ACCELERATION (g's)	
X-DIRECTION	-9.51
Y-DIRECTION	-4.88
PHD (optional)	N/A
ASI (optional)	0.591
TEST ARTICLE DEFLECTIONS (m)	
DYNAMIC	N/A
PERMANENT	N/A
VEHICLE DAMAGE	
EXTERIOR	
VDS	
CDC	
INTERIOR	
OCDI	
POST IMPACT VEHICULAR BEHAVIOR	
MAXIMUM ROLL ANGLE (Deg.)	-1.78
MAXIMUM PITCH ANGLE (Deg.)	-2.19
MAXIMUM YAW ANGLE (Deg.)	4.34

DATA SHEET NO. 9
SUMMARY OF RESULTS FOR TEST NO. 3-42

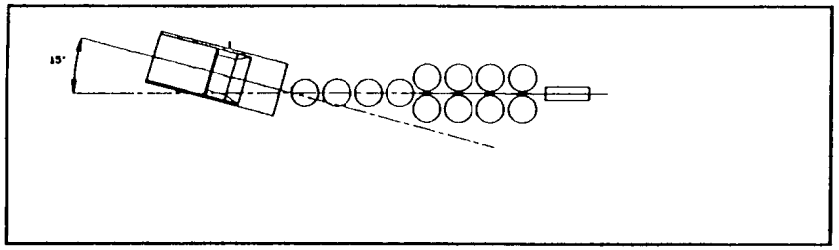


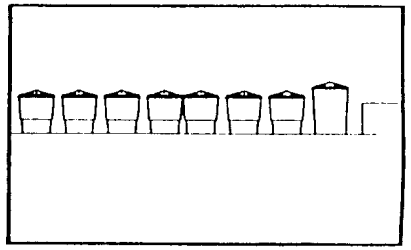


GENERAL INFORMATION	
TEST AGENCY	KARCO ENGINEERING
TEST NO.	110
DATE	4/14/98
TEST ARTICLE	
TYPE	CRASH CUSHION
INSTALLATAION LENGTH (m)	10.1 m (33.0 ft.)
SIZE AND/OR DIMENSION OF KEY ELEMENTS	VARIABLE WEIGHT MODULES
SOIL TYPE AND CONDITION	DRY SAND
TEST VEHICLE	
TYPE	PRODUCTION
DESIGNATION	820C
MODEL	FORD FESTIVA
MASS (CURB)	825 kg
MASS (TEST INERTIAL)	805 kg
DUMMY(s) MASS	75
GROSS STATIC WEIGHT	880 kg
IMPACT CONDITIONS	
SPEED (km/h)	103.6 km/h
ANGLE (Deg.)	15°
IMPACT SEVERITY (kJ)	333.4
EXIT CONDITIONS	
SPEED (km/h)	3.1
ANGLE (Deg.)	205

OCCUPANT RISK VALUES	
IMPACT VELOCITY (m/sec)	
X-DIRECTION	8.13
Y-DIRECTION	0.67
THIV (optional)	N/A
RIDEDOWN ACCELERATION (g's)	
X-DIRECTION	-12.73
Y-DIRECTION	8.43
PHD (optional)	N/A
ASI (optional)	0.786
TEST ARTICLE DEFLECTIONS (m)	
DYNAMIC	N/A
PERMANENT	N/A
VEHICLE DAMAGE	
EXTERIOR	
VDS	
CDC	
INTERIOR	
OCDI	
POST IMPACT VEHICULAR BEHAVIOR	
MAXIMUM ROLL ANGLE (Deg.)	27.94
MAXIMUM PITCH ANGLE (Deg.)	10.20
MAXIMUM YAW ANGLE (Deg.)	-205.45

DATA SHEET NO. 12
SUMMARY OF RESULTS FOR TEST NO. 3-43

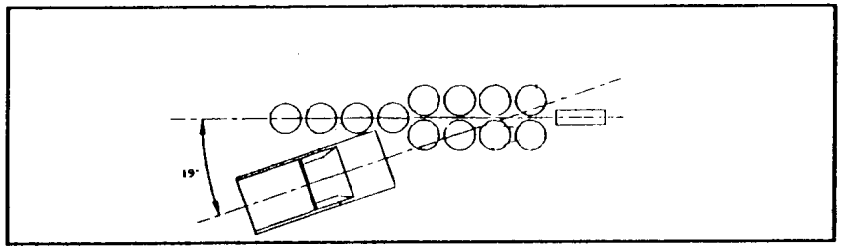


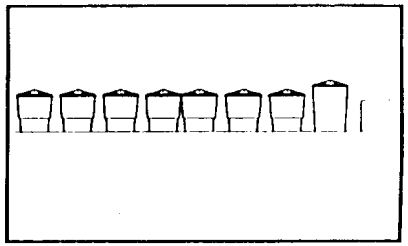


GENERAL INFORMATION	
TEST AGENCY	KARCO ENGINEERING
TEST NO.	120
DATE	4/28/98
TEST ARTICLE	
TYPE	CRASH CUSHION
INSTALLATAION LENGTH (m)	10.1 m (33.0 ft.)
SIZE AND/OR DIMENSION OF KEY ELEMENTS	VARIABLE WEIGHT MODULES
SOIL TYPE AND CONDITION	DRY SAND
TEST VEHICLE	
TYPE	PRODUCTION
DESIGNATION	2000P
MODEL	CHEVROLET CHEYENE 1500
MASS (CURB)	1783 kg
MASS (TEST INERTIAL)	1986 kg
DUMMY(s) MASS	N/A
GROSS STATIC WEIGHT	1986 kg
IMPACT CONDITIONS	
SPEED (km/h)	90.3
ANGLE (Deg.)	15°
IMPACT SEVERITY (kJ)	624.8
EXIT CONDITIONS	
SPEED (km/h)	45
ANGLE (Deg.)	10°

OCCUPANT RISK VALUES	
IMPACT VELOCITY (m/sec)	
X-DIRECTION	6.16
Y-DIRECTION	-0.61
THIV (optional)	N/A
RIDEDOWN ACCELERATION (g's)	
X-DIRECTION	-6.81
Y-DIRECTION	-6.02
PHD (optional)	N/A
ASI (optional)	0.393
TEST ARTICLE DEFLECTIONS (m)	
DYNAMIC	N/A
PERMANENT	N/A
VEHICLE DAMAGE	
EXTERIOR	
VDS	
CDC	
INTERIOR	
OCDI	
POST IMPACT VEHICULAR BEHAVIOR	
MAXIMUM ROLL ANGLE (Deg.)	3.88
MAXIMUM PITCH ANGLE (Deg.)	3.57
MAXIMUM YAW ANGLE (Deg.)	-11.97

DATA SHEET NO. 15
SUMMARY OF RESULTS FOR TEST NO. 3-44





GENERAL INFORMATION	
TEST AGENCY	KARCO ENGINEERING
TEST NO.	130
DATE	5/12/98
TEST ARTICLE	
TYPE	CRASH CUSHION
INSTALLATAION LENGTH (m)	10.1 m (33.0 ft)
SIZE AND/OR DIMENSION OF KEY ELEMENTS	VARIABLE WEIGHT MODULES
SOIL TYPE AND CONDITION	DRY SAND
TEST VEHICLE	
TYPE	PRODUCTION
DESIGNATION	2000P
MODEL	FORD F-250 PICK UP
MASS (CURB)	2174 kg
MASS (TEST INERTIAL)	2046 kg
DUMMY(s) MASS	N/A
GVWR	3902 kg
IMPACT CONDITIONS	
SPEED (km/h)	96.7
ANGLE (Deg.)	20°
IMPACT SEVERITY (kJ)	738.2
EXIT CONDITIONS	
SPEED (km/h)	3
ANGLE (Deg.)	5°

OCCUPANT RISK VALUES	
IMPACT VELOCITY (m/sec)	
X-DIRECTION	9.31
Y-DIRECTION	-0.33
THIV (optional)	N/A
RIDEDOWN ACCELERATION (g's)	
X-DIRECTION	-14.59
Y-DIRECTION	-5.34
PHD (optional)	N/A
ASI (optional)	0.786
TEST ARTICLE DEFLECTIONS (m)	
DYNAMIC	N/A
PERMANENT	N/A
VEHICLE DAMAGE	
EXTERIOR	
VDS	
CDC	
INTERIOR	
OCDI	
POST IMPACT VEHICULAR BEHAVIOR	
MAXIMUM ROLL ANGLE (Deg.)	-17.8
MAXIMUM PITCH ANGLE (Deg.)	6.4
MAXIMUM YAW ANGLE (Deg.)	9.6

these materials must occur in the United States.

(2) The State has standard contract provisions that require the use of domestic materials and products, including steel materials, to the same or greater extent as the provisions set forth in this section.

(3) The State elects to include alternate bid provisions for foreign and domestic steel materials which comply with the following requirements. Any procedure for obtaining alternate bids based on furnishing foreign steel materials which is acceptable to the Division Administrator may be used. The contract provisions must (i) require all bidders to submit a bid based on furnishing domestic steel materials, and (ii) clearly state that the contract will be awarded to the bidder who submits the lowest total bid based on furnishing domestic steel materials unless such total bid exceeds the lowest total bid based on furnishing foreign steel materials by more than 25 percent.

(4) When steel materials are used in a project, the requirements of this section do not prevent a minimal use of foreign steel materials, if the cost of such materials used does not exceed one-tenth of one percent (0.1 percent) of the total contract cost or $2,500, whichever is greater. For purposes of this paragraph, the cost is that shown to be the value of the steel products as they are delivered to the project.

(c)(1) A State may request a waiver of the provisions of this section if;

(i) The application of those provisions would be inconsistent with the public interest; or

(ii) Steel materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

(2) A request for waiver, accompanied by supporting information, must be submitted in writing to the Regional Federal Highway Administrator (RFHWA) through the FHWA Division Administrator. A request must be submitted sufficiently in advance of the need for the waiver in order to allow time for proper review and action on the request. The RFHWA will have approval authority on the request.

(3) Requests for waivers may be made for specific projects, or for certain materials or products in specific geographic areas, or for combinations of both, depending on the circumstances.

(4) The denial of the request by the RFHWA may be appealed by the State to the Federal Highway Administrator (Administrator), whose action on the request shall be considered administratively final.

(5) A request for a waiver which involves nationwide public interest or availability issues or more than one FHWA region may be submitted by the RFHWA to the Administrator for action.

(6) A request for waiver and an appeal from a denial of a request must include facts and justification to support the granting of the waiver. The FHWA response to a request or appeal will be in writing and made available to the public upon request. Any request for a nationwide waiver and FHWA's action on such a request may be published in the FEDERAL REGISTER for public comment.

(7) In determining whether the waivers described in paragraph (c)(1) of this section will be granted, the FHWA will consider all appropriate factors including, but not limited to, cost, administrative burden, and delay that would be imposed if the provision were not waived.

(d) Standard State and Federal-aid contract procedures may be used to assure compliance with the requirements of this section.

(23 U.S.C. 315, sec. 10 of Pub. L. 98-229, 98 Stat. 55, sec. 165 of Pub. L. 97-424, 96 Stat. 2136 and 49 CFR 1.48(b))

[48 FR 53104, Nov. 25, 1983, as amended at 49 FR 18821, May 3, 1984]

§ 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.

§ 635.413 Guaranty and warranty clauses.

(a) Except as provided in paragraph (b) of this section, clauses that require the contractor to guarantee or warrant materials and workmanship or to otherwise maintain the work for a specified period after its satisfactory completion by the contractor and its final acceptance by the State, will not be approved for use in Federal-aid contracts. Work performed and materials replaced under such guaranty or warranty clauses after final acceptance of work are not eligible for Federal participation.

(b) Contracts which involve furnishing and/or installing electrical or mechanical equipment should generally include contract clauses that require:

(1) Manufacturer's warranties or guarantees on all electrical and mechanical equipment consistent with those provided as customary trade practice, or

(2) Contractors' warranties or guarantees providing for satisfactory in-service operation of the mechanical and electrical equipment and related components for a period not to exceed 6 months following project acceptance.

§ 635.417 Convict produced materials.

(a) Materials produced by convict labor may only be incorporated in a Federal-aid highway construction project if such materials have been:

(1) Produced by convicts who are on parole, supervised release, or probation from a prison or

(2) Produced in a qualified prison facility and the cumulative annual production amount of such materials for use in Federal-aid highway construction does not exceed the amount of such materials produced in such facility for use in Federal-aid highway construction during the 12-month period ending July 1, 1987.

(b) *Qualified prison facility* means any prison facility in which convicts,