

MEDIX DYNAMIC TESTING:

Module Integrity [SAE J3057 Compliance]

Worse case scenario = Type-III 170" Module >>>> **PASS**



Test Report

Location of Test Laboratory:

Center for Advanced Product Evaluation
18881 IMMI Way
Westfield, IN 46074-1020
317-896-9531 phone
317-867-2305 fax
www.capectesting.com

CAPE Test Request Number:

CTR11780

Test Subject:

Medix Specialty Vehicles Ambulance Modules

Test Methods Used:

SAE J3057, Ambulance Modular Body Evaluation-Quasi-Static Loading For Type I and Type III Modular Ambulance Bodies

Receipt of Test Items Date:

June 19, 2017

Test Date:

June 26, 2017

Customer:

Medix Specialty Vehicles

Report Approved By:
Ryan Hoover

A handwritten signature in black ink, appearing to read "Ryan Hoover".

CAPE Technical Director

Report Prepared By:
Seth Biddle

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CAPE Test Engineer

MEDIX DYNAMIC TESTING:

Module Integrity [SAE J3057 Compliance]



CTR11780 Test Report

Purpose

The purpose of this test series is to evaluate the crush resistance, operation of doors, and body mount-to-frame connections of the Medix Specialty Vehicles ambulance type III modules to SAE J3057₁ specifications.

Procedure

Dynamic Preload and Quasi-Static Roof Strength

SAE J3057 requires a platen to impact the vehicle. The platen used for the test series was manufactured as a specialty cart, with a rigid vertical steel platen fastened to the front of the vehicle.

The total weight of the cart with platen is 14,530 lbs. Table 1, Dynamic Impact Target Values summarizes the target energy values for the dynamic tests.

The quasi-static roof strength portion of SAE J3057 for test 002 was performed by using a four post hydraulically controlled load platen with load cells and LVDT. The platen was lowered to a force two and a half times the curb weight for the vehicle and brought back to curb weight at which time the doors are tested to ensure they will open. The curb weights and target loads are listed in table 2.

Table 1, Dynamic Impact Target Values

Test	Module	Target speed of cart at impact [kph (mph)]	Kinetic energy of cart at impact [J (ft-lbf)]
001	Medix 170 M2 Type III	12.2 (7.6)	37,965 (28,000)

Table 2, Vehicle Curb Weights and Target Loads

Test	Module	Curb Weight [kg (lbm)]	Target Load [N (lbf)]
002	Medix 170 M2 Type III	6,230 (13,735)	152,743 (34,338)

Pre-test and post-test photographs were taken to document the test set-up and the condition of the cabs. The pre-test and post-test photographs may be found in the appendices of the test report.

CAPE instrumentation systems and post-processing software follow SAE J211₄ performance requirements and SAE J1733₅ coordinate systems. Standard calculations and numerical methods for processing safety test instrumentation data acquired during impact tests with instruments installed in

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CTR11780 Test Report

ATD's, vehicle structures and laboratory fixtures are processed following SAE J1727₆. The test data plots may be found in the appendices of the test report. Off-board high-speed digital imagers were set up to capture the impact event of each sled run. The video files are included with the electronic test report.

Test Requirements

Table 3, Performance Criteria

Item	Description
1	For the dynamic pre-load phase of the test, the minimum energy level is 37965 Joules (28000 ft-lbf).
2	The Modular Body must remain attached to the Simulated Frame Rails through at least two Body Mounts, with at least one Body Mount attached on each Simulated Frame Rail, through both phases of testing (dynamic and quasi-static roof crush)
3	The test floor fixture used in the dynamic test remained at 20 +/-1 degrees post-test
4	All doors remained latched during each phase of testing (dynamic, quasi-static roof crush).
5	Verify that the maximum measured vertical displacement at any one or more of the four indicated reference points in the Modular Body did not exceed 130 mm (5.125 in).
6	Verify that all entry doors were able to be opened as per 5.8.5.2 and 6.8.9.

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CTR11780 Test Matrix

18881 IMMI Way
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317-896-9531 phone
317-867-2305 fax

Test Number:	CTR11780	Test Date:	6/26/2017
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Customer:	Medix Specialty Vehicles	Test Results: Graphs, pre, and post-test photographs may be found in the accompanying sheets.
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Test Matrix

Test #	Module	Test	Platen Weight [lbs]	Cart Speed [mph]	Curb Weight [lbs]	Notes
001	Medix 170 M2 Type III	Dynamic Pre-Load	14,530	7.6	NA	
002	Medix 170 M2 Type III	Quasi-Static	NA	NA	13,735	



CTR11780 Test Results

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Test Results

Test #	Module	Test	Energy >37,965 J	Body Maintained Mounting	Fixture Remained at 20 degrees	Doors Remain Latched	Displacement < 5.125 inch	Doors Able to be Opened
001	Medix 170 M2 Type III	Dynamic Pre-Load	Yes	Yes	Yes	Yes	N/A	Yes
002	Medix 170 M2 Type III	Quasi-Static	N/A	Yes	N/A	Yes	Yes	Yes



MEDIX DYNAMIC TESTING:

Module Integrity [SAE J3057 Compliance]



Date: June 27, 2017

Re: Medix Specialty Vehicles Inc.

3008 Mobile Drive

Elkhart IN 46514

This document confirms that CAPE performed testing under project number CTR11648 to SAE Surface Vehicle Recommended Practice J3057 Ambulance Modular Body Evaluation-Quasi-Static Loading for Type I and Type III Modular Ambulance Bodies utilizing a Medix supplied 170 type III modular body. All SAE J3057 required test parameters and all SAE J3057 performance requirements were met and/or exceeded.

Kind Regards,

Ryan W Hoover, PE
CAPE Technical Director

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REF: (CTR11780-001, CTR11780-002)
SAE J3057 Feb 2017

MEDIX DYNAMIC TESTING:

Occupant Belting / Excursion [SAE J3026 Compliance]



Test Report

Location of Test Laboratory:

Center for Advanced Product Evaluation
18881 IMMI Way
Westfield, IN 46074-1020
317-896-9531 phone
317-867-2305 fax
www.capetesting.com

CAPE Test Request Number:

CTR11333

Test Subject:

Medix Specialty Vehicles

Test Methods Used:

Dynamic Sled Test – Servo Sled SOP
SAE J3026₁
SAE J2917₂
SAE J2956₃

Receipt of Test Items Date:

December, 2016

Test Date:

December 14, 2016 – January 20, 2017

Customer:

Medix Specialty Vehicles

Report Approved By:
Ryan Hoover

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CAPE Technical Director

Report Prepared By:
Seth Biddle

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CAPE Test Engineer

MEDIX DYNAMIC TESTING:

Occupant Belting / Excursion [SAE J3026 Compliance]



CTR11333 Test Report

Purpose

The dynamic sled test series was performed to evaluate the Medix Specialty Vehicles squad bench, CPR, and attendant ambulance seating when tested to the SAE J3026₁ specification using SAE J2917₂ and SAE J2956₃ conditions.

Procedure

An acceleration servo sled was used to conduct the SAE J2917₂ and SAE J2956₃ sled tests.

An instrumented HIII 50th and Medix Specialty Vehicles module sections were used for testing.

Pre-test and post-test photographs were taken to document the test set-up and the condition of the seat and seat structure. The pre-test and post-test photographs may be found in the appendices of the test report.

CAPE instrumentation systems and post-processing software follow SAE J211₄ performance requirements and SAE J1733₅ coordinate systems. Standard calculations and numerical methods for processing safety test instrumentation data acquired during impact tests with instruments installed in ATD's, vehicle structures and laboratory fixtures are processed following SAE J1727₆. The test data plots may be found in the appendices of the test report. On-board high-speed digital imagers were set up to capture the impact event of each sled run. The video files are included with the electronic test report.

Test Requirements

Table 1, SAE J2917₂ Applicable Test Requirements, lists the evaluation parameters for the sled test.

Table 1 – SAE J2917 Applicable Test Requirements

Criteria	Requirement
SAE J2917 Sled Deceleration [g]	Within SAE J2917 Figure 1 Corridor
Sled Delta V [kph (mph)]	49.9 ± 1.6 (31.0 ± 1.0)

Table 2, SAE J2956₃ Applicable Test Requirements, lists the evaluation parameters for the sled test.

Table 2 – SAE J2956 Applicable Test Requirements

Criteria	Requirement
SAE J2956 Sled Deceleration [g]	Within SAE J2956 Figure 1 Corridor
Sled Delta V [kph (mph)]	24.1 ± 1.6 (15.0 ± 1.0)

The ATD measurements were compared to the Injury Assessment Reference Values (IARV's) specified by SAE J3026₁ for hybrid III 50th percentile ATD.

When the ATD is facing forward or rearward relative to the impact, IARV's are as shown in table 3.

Table 3 – IARV's for ATD Forward or Rear Facing Relative to the Impact

IARV - Description	IARV 50th
Head Injury Criterion 36 ms (HIC36)	1000
Neck Injury Index (Nij)	1.0
Peak Neck Tension [N (lbf)]	4170 (937)
Peak Neck Compression [N (lbf)]	4000 (899)
Chest Resultant Acceleration 3 ms Clip	60.0
Peak Chest Compression [mm (in)]	63 (2.5)
Peak Femur Compression [kN (lbf)]	10.0 (2,250)

Table 4 – IARV's for ATD Lateral Facing Relative to the Impact

IARV - Description	IARV 50th
Head Injury Criterion 36 ms (HIC36)	1000
Chest Resultant Acceleration 3 ms Clip	60.0

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Occupant Belting / Excursion [SAE J3026 Compliance]



CTR11333 Test Matrix

18881 US 31 North
Westfield, IN 46074-1020
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317-867-2305 fax

Test Number:	CTR11333	Test Date:	12/14/2016 – 1/20/2017
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Customer:	Medix Specialty Vehicles	Test Results: Graphs, pre, and post-test photographs may be found in the accompanying sheets.
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Test Matrix

Test #	Test Method	ID No.	ATD	Desc.	ATD Weight [lbs]	Instrumentation	Seat	Seat Adjust Position	Belt Configuration	Notes
001	SAE J2956 Corridor	A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z	Attendant	Fixed	4 point belt	Street Side Impact Pulse
		A12	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	CPR	Fixed	4 point belt	
002	SAE J2956 Corridor	A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z	Attendant	Fixed	4 point belt	Curb Side Impact Pulse
		A12	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	CPR	Fixed	4 point belt	
003	SAE J2956 Corridor	A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z	Attendant	Fixed	6 point belt	Curb Side Impact Pulse
		A12	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	CPR	Fixed	6 point belt	
004	SAE J2956 Corridor	A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec	Squad Bench Front	Fixed	4 point belt	Street Side Impact Pulse
		A12	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	Squad Bench Rear	Fixed	4 point belt	
005	SAE J2956 Corridor	A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec	Squad Bench Front	Fixed	6 point belt	Street Side Impact Pulse
		A12	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	Squad Bench Rear	Fixed	6point belt	
006	SAE J2956 Corridor	A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec	Squad Bench Front	Fixed	4 point belt	Curb Side Impact Pulse
		A12	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	Squad Bench Rear	Fixed	4 point belt	
007	SAE J2956 Corridor	A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec	Squad Bench Front	Fixed	6 point belt	Curb Side Impact Pulse
		A12	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	Squad Bench Rear	Fixed	6 point belt	
008	SAE J2917 Coridor	A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z	Squad Bench Front	Fixed	4 point belt	Frontal Impact Pulse
		A12	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z	Squad Bench Rear	Fixed	4 point belt	
009	SAE J2917 Corridor	A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	Attendant	Fixed	4 point belt	Frontal Impact Pulse
		A12	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z	CPR	Fixed	4 point belt	
010	SAE J2917 Corridor	A7	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	Attendant	Fixed	4 point belt	Frontal Impact Pulse
		A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z	CPR	Fixed	4 point belt	
011	SAE J2917 Corridor	A7	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z Chest Deflec Neck Fx,Fy, Fz Neck Mx,My, Mz Femur Fx	Attendant	Fixed	6 point belt	Frontal Impact Pulse
		A10	HIII50M	50th %	171.0	Head X,Y,Z Chest X,Y,Z	CPR	Fixed	6 point belt	

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Occupant Belting / Excursion [SAE J3026 Compliance]

18881 US 31 North
Westfield, IN 46074-1020
317-896-9531 phone
317-867-2305 fax

CTR11333 Test Results



Test Number:	CTR11333	Test Date:	12/14/2016 - 1/20/2017
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Customer:	Medix Speciality Vehicles	Test Results: Graphs, pre, and post-test photographs may be found in the accompanying sheets.
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Occupant Measurements - ATD Head and Chest

Test #	ATD	HIC 36	Head Resultant Max	Head Accel X Max/Min	Head Accel Y Max/Min	Head Accel Z Max/Min	Chest Resultant	Chest Accel X Max/Min	Chest Accel y Max/Min	Chest Accel z Max/Min	Chest 3ms Clip	Chest Deflection
			[g]	[g]	[g]	[g]	[g]	[g]	[g]	[g]	[g]	[mm]
001	A10 HIISOM	110.7	37.5	7.6 -18.6	5.7 -22.0	35.3 -5.9	46.3	9.3 -4.7	3.0 -45.9	3.0 -6.3	44.7	
001	A12 HIISOM	349.7	67.4	62.1 -15.0	9.1 -3.2	27.1 -18.7	49.9	49.2 -7.9	2.6 -3.0	14.9 -11.0	45.7	-10.4 (-0.4)
002	A10 HIISOM	183.7	34.6	9.2 -25.2	26.0 -6.1	28.1 -9.8	19.1	3.5 -7.3	16.1 -1.6	11.3 -3.5	18.9	
002	A12 HIISOM	85.3	36.0	4.3 -21.4	1.5 -4.6	32.7 -3.3	41.5	8.6 -38.0	3.2 -6.8	18.4 -12.8	38.7	-18.0 (-0.7)
003	A10 HIISOM	109.3	26.6	9.0 -12.0	21.0 -7.0	20.7 -6.9	20.7	2.2 -6.8	18.7 -1.6	9.3 -2.1	20.1	
003	A12 HIISOM	151.9	44.0	10.2 -22.5	2.4 -5.1	38.5 -10.0	38.9	6.9 -35.4	1.9 -3.6	17.3 -9.4	37.8	-21.2 (-0.8)
004	A10 HIISOM	103.4	39.1	11.6 -25.0	4.0 -3.9	35.2 -4.4	43.9	8.4 -41.0	1.5 -4.7	17.4 -14.0	42.6	-14.4 (-0.6)
004	A12 HIISOM	175.1	50.0	4.7 -24.5	4.1 -5.0	45.3 -11.5	49.7	7.8 -42.4	4.6 -4.4	26.1 -13.3	47.1	-18.0 (-0.7)
005	A10 HIISOM	187.5	52.3	19.2 -28.2	4.2 -5.2	45.1 -14.7	41.3	7.7 -36.2	2.1 -3.0	21.8 -14.3	40.0	-20.1 (-0.8)
005	A12 HIISOM	196.4	47.1	42.9 -23.2	4.6 -7.1	41.8 -8.2	41.9	6.5 -35.9	2.9 -5.0	22.2 -12.0	41.1	-26.4 (-1.0)
006	A10 HIISOM	126.8	46.2	35.4 -13.2	14.0 -9.9	46.0 -28.8	46.9	46.0 -9.4	5.1 -3.4	5.7 -10.6	45.2	-3.4 (-0.1)
006	A12 HIISOM	158.3	49.3	36.0 -9.7	5.7 -3.6	36.9 -16.7	47.6	45.4 -9.8	4.4 -3.3	5.4 -14.3	46.2	-8.0 (-0.3)
007	A10 HIISOM	110.6	40.1	30.7 -17.7	10.2 -5.9	39.2 -27.6	49.2	47.8 -10.4	5.1 -2.8	7.1 -11.6	46.9	-4.5 (-0.2)
007	A12 HIISOM	152.1	48.6	21.5 -9.1	7.0 -4.0	45.0 -21.3	53.2	51.0 -9.8	6.0 -10.5	7.0 -15.6	48.5	-7.4 (-0.3)
008	A10 HIISOM	699.2	65.7	6.3 -25.4	11.2 -51.3	62.3 -3.5	47.9	22.8 -12.8	15.2 -45.3	20.6 -25.3	47.3	
008	A12 HIISOM	964.0	67.4	7.0 -22.3	6.0 -64.9	55.5 -1.6	45.0	16.1 -11.4	7.5 -44.2	12.7 -9.3	42.4	
009	A10 HIISOM	499.5	120.6	119.6 -11.2	14.2 -5.3	20.0 -17.3	37.7	37.7 -7.9	3.5 -2.4	9.2 -3.0	36.6	-6.8 (-0.3)
009	A12 HIISOM	502.3	96.6	19.9 -23.2	94.2 -27.1	20.7 -22.7	59.7	16.3 -9.8	59.1 -8.4	13.3 -7.1	58.6	

Test #	ATD	Upper Neck FX Max/Min	Upper Neck FY Max/Min	Upper Neck FZ Max/Min	Upper Neck Mox Max/Min	Upper Neck Mocy Max/Min	Upper Neck MZ Max/Min	Nte	Ntf	Nce	Ncf
		[N (lbf)]	[N (lbf)]	[N (lbf)]	[N-m (lbf-in)]	[N-m (lbf-in)]	[N-m (lbf-in)]				
001	A10 HIISOM										
001	A12 HIISOM	730.1 (164.1) -512.8 (-115.3)	159.8 (35.9) -84.6 (-19.0)	1590.0 (357.4) -498.5 (-112.1)	4.0 (3.0) -9.5 (-7.0)	52.1 (38.4) -34.6 (-25.5)	3.7 (2.7) -2.4 (-1.7)	0.19	0.34	0.28	0.17
002	A10 HIISOM										
002	A12 HIISOM	47.1 (10.6) -629.4 (-141.5)	44.0 (9.9) -86.9 (-19.5)	1437.2 (323.1) -138.3 (-31.1)	4.0 (2.9) -9.9 (-7.3)	55.0 (40.6) -29.7 (-21.9)	2.6 (1.9) -3.7 (-2.7)	0.43	0.22	0.00	0.10
003	A10 HIISOM										
003	A12 HIISOM	175.8 (39.5) -794.8 (-178.7)	19.2 (4.3) -94.6 (-21.3)	1711.8 (384.8) -366.8 (-82.5)	3.5 (2.6) -8.4 (-6.2)	72.2 (53.3) -31.2 (-23.0)	1.7 (1.3) -2.0 (-1.5)	0.43	0.23	0.29	0.27
004	A10 HIISOM	197.4 (44.4) -854.7 (-192.1)	64.6 (14.5) -48.3 (-10.9)	1668.0 (375.0) -218.4 (-49.1)	6.9 (5.1) -5.7 (-4.2)	72.6 (53.5) -31.5 (-23.2)	2.9 (2.1) -1.4 (-1.0)	0.47	0.24	0.03	0.20
004	A12 HIISOM	180.9 (40.7) -934.0 (-210.0)	24.9 (5.6) -123.0 (-27.7)	1908.4 (429.0) -550.9 (-123.8)	4.5 (3.3) -12.6 (-9.3)	65.3 (48.1) -39.8 (-29.4)	1.7 (1.2) -2.6 (-1.9)	0.57	0.21	0.03	0.28
005	A10 HIISOM	197.4 (44.4) -893.5 (-200.9)	76.7 (17.2) -101.6 (-22.8)	2018.1 (453.7) -552.6 (-124.2)	11.1 (8.2) -12.0 (-8.8)	82.4 (60.8) -34.0 (-25.1)	2.8 (2.1) -3.5 (-2.6)	0.48	0.23	0.28	0.35
005	A12 HIISOM	122.8 (27.6) -851.6 (-191.4)	48.4 (10.9) -183.8 (-41.3)	1832.4 (411.9) -543.9 (-122.3)	5.3 (3.9) -15.8 (-11.7)	75.1 (55.4) -28.4 (-20.9)	2.4 (1.8) -2.8 (-2.0)	0.47	0.23	0.21	0.29
006	A10 HIISOM	687.2 (154.5) -362.6 (-81.5)	178.1 (40.0) -42.6 (-9.6)	1545.1 (347.4) -833.9 (-187.5)	13.7 (10.1) -5.0 (-3.7)	49.1 (36.2) -64.0 (-47.2)	5.4 (4.0) -2.5 (-1.8)	0.64	0.23	0.00	0.25
006	A12 HIISOM	621.2 (139.7) -362.7 (-81.5)	134.5 (30.2) -38.5 (-8.7)	1550.9 (348.7) -645.4 (-145.1)	6.8 (5.0) -2.8 (-2.0)	51.0 (37.6) -38.9 (-28.7)	4.6 (3.4) -3.3 (-2.4)	0.34	0.25	0.28	0.22
007	A10 HIISOM	675.3 (151.8) -305.5 (-68.7)	126.8 (28.5) -86.9 (-19.5)	1502.8 (337.8) -1190.2 (-267.6)	15.6 (11.5) -7.6 (-5.6)	59.5 (43.9) -68.4 (-50.4)	4.7 (3.5) -4.1 (-3.0)	0.67	0.26	0.02	0.31
007	A12 HIISOM	713.3 (160.4) -339.7 (-76.4)	111.6 (25.1) -56.8 (-12.8)	1806.1 (406.0) -777.5 (-174.8)	4.1 (3.0) -2.8 (-2.1)	60.8 (44.9) -57.0 (-42.0)	3.5 (2.6) -1.1 (-0.8)	0.57	0.27	0.32	0.26
008	A10 HIISOM										



MEDIX DYNAMIC TESTING:

COT / Litter Retention [SAE J3026 Compliance]



CTR11969 Test Report

Location of Test Laboratory:

Center for Advanced Product Evaluation
18881 IMMI Way
Westfield, IN 46074-1020
317-896-9531 phone
317-867-2305 fax
www.capetesting.com

CAPE Test Request Number:

CTR11969

Test Subject:

Medix Floor Section
Ford Transit BIW
Stryker Litter Retention System and Analog COT
Ferno Stat Trac Litter Retention System and PowerFlexx Cot

Test Methods Used:

Dynamic Sled Test – Servo Sled SOP
SAE J3102₁
SAE J2917₂
SAE J2956₃

Receipt of Test Items Date:

September 2017

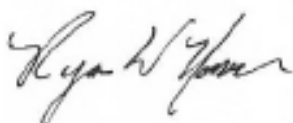
Test Date:

September 13-28, 2017

Customer:

Medix Specialty Vehicles

Report Approved By:
Ryan Hoover



CAPE Technical Director

Report Prepared By:
Seth Biddle



CAPE Test Engineer

MEDIX DYNAMIC TESTING:

COT / Litter Retention [SAE J3026 Compliance]



CTR11969 Test Report

Purpose

The dynamic sled test series was performed to evaluate the Stryker and Ferno litter retention systems in a Medix ambulance floor section and a Ford Transit BIW to the SAE J3102₁ specification using SAE J2917₂ and SAE J2956₃ conditions.

Procedure

An acceleration servo sled was used to conduct the SAE J2917₂ and SAE J2956₃ sled tests.

An instrumented HIII 50th with a Stryker and Ferno litter retention systems were used for testing.

Pre-test and post-test photographs were taken to document the test set-up and the condition of the seat and seat structure. The pre-test and post-test photographs may be found in the appendices of the test report.

CAPE instrumentation systems and post-processing software follow SAE J2114 performance requirements and SAE J1733₅ coordinate systems. Standard calculations and numerical methods for processing safety test instrumentation data acquired during impact tests with instruments installed in ATD's, vehicle structures and laboratory fixtures are processed following SAE J1727₆. The test data plots may be found in the appendices of the test report. On-board high-speed digital imagers were set up to capture the impact event of each sled run. The video files are included with the electronic test report.

Test Requirements

Table 1, SAE J2917₂ Applicable Test Requirements, lists the evaluation parameters for the sled test.

Table 1 – SAE J2917 Applicable Test Requirements

Criteria	Requirement
SAE J2917 Sled Deceleration [g]	Within SAE J2917 Figure 1 Corridor
Sled Delta V [kph (mph)]	49.9 ± 1.6 (31.0 ± 1.0)

Table 2, SAE J2956₃ Applicable Test Requirements, lists the evaluation parameters for the sled test.

Table 2 – SAE J2956 Applicable Test Requirements

Criteria	Requirement
SAE J2956 Sled Deceleration [g]	Within SAE J2956 Figure 1 Corridor
Sled Delta V [kph (mph)]	24.1 ± 1.6 (15.0 ± 1.0)

Table 3, SAE J3102₁ Applicable Test Requirements, lists the evaluation parameters for the sled test.

Table 3 – SAE J3102 Applicable Test Requirements

Criteria
Ambulance substructure must remained attached to the sled
Deformation and displacement of the ambulance substructure, mounting hardware, and dynamic test analog/service is acceptable
Fracture of the substructure is acceptable as long as a load path is maintained

MEDIX DYNAMIC TESTING:

COT / Litter Retention [SAE J3026 Compliance]



CTR11969 Test Matrix

18881 IMMI Way
Westfield, IN 46074-1020
317-896-9531 phone
317-867-2305 fax

Test Number:	CTR11969	Test Date:	9/13/2017-9/28/2017
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Customer:	Medix	Test Results: Graphs, pre, and post-test photographs may be found in the accompanying sheets.
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Test Matrix

Test #	Test Method	Vehicle	Cot	Recline Angle	Notes
001	SAE J2917 Corridor	Medix Ford Transit BIW	Stryker Analog	15.0 degree	Frontal Impact
002	SAE J2956 Corridor	Medix Ford Transit BIW	Stryker Analog	15.0 degree	Side Impact
003	SAE J2956 Corridor	Medix Module Floor Section	Stryker Analog	15.0 degree	Side Impact
004	SAE J2917 Corridor	Medix Module Floor Section	Stryker Analog	15.0 degree	Frontal Impact
005	SAE J2917 Corridor	Medix Module Floor Section	Ferno Stat Trac w/ Powerflexx cot	15.0 degree	Frontal Impact
006	SAE J2956 Corridor	Medix Module Floor Section	Ferno Stat Trac w/ Powerflexx cot	15.0 degree	Side Impact

Test Number:	CTR11969	Test Date:	9/13/2017-9/28/2017
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Customer:	Medix	Test Results: Graphs, pre, and post-test photographs may be found in the accompanying sheets.
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Test Matrix

007	SAE J2956 Corridor	Medix Ford Transit BIW	Medix Sliding Top Cabinet	N/A	Frontal Impact
			Ferno Stat Trac w/ Powerflexx cot	15.0 degree	
008	SAE J2917 Corridor	Medix Ford Transit BIW	Ferno Stat Trac w/ Powerflexx cot	15.0 degree	Frontal Impact

MEDIX DYNAMIC TESTING:

COT / Litter Retention [SAE J3026 Compliance]

STRYKER



FERNO



MEDIX DYNAMIC TESTING:

Cabinet Latch Load Rating [SAE J3058 Compliance]



CTR14210

Test Report

Center for Advanced Product Evaluation
capetesting.com

Location of Test Laboratory:

Center for Advanced Product Evaluation
18881 IMMI Way
Westfield, IN 46074-1020
317-896-9531 phone
www.capetesting.com

Test Subject:

Medix Ambulance Storage Devices

Test Methods Used:

Dynamic Sled Test – Servo Sled SOP
SAE J3058₁
SAE J2917₂
SAE J2956₃
SAE J3044₄

Receipt of Test Items Date:

July 15, 2020

Test Date:

July 20-21, 2020

Customer:

Medix Specialty Vehicles LLC.

3008 Mobile Drive
Elkhart, IN 46514

Report Approved By:

Ryan Hoover

Report Prepared By:

Seth Biddle

CAPE Technical Director

CAPE Test Engineer

MEDIX DYNAMIC TESTING:

Cabinet Latch Load Rating [SAE J3058 Compliance]



CTR14210 Test Report

Center for Advanced Product Evaluation
capetesting.com

Purpose

The purpose of this test series is to evaluate Medix Specialty Vehicles LLC ambulance storage devices to SAE J3058₁ conditions using SAE J2917₂, SAE J2956₃, and SAE J3044₄ pulse parameters.

Procedure

An acceleration servo sled was used to conduct the sled tests. Ambulance storage devices were mounted on the sled. See attached test matrix for analog and pulse profile. Lead shot bags were used as weight in the devices and were placed on risers that are 0.3 of the height of the opening. An accelerometer was installed on the sled to capture the acceleration profile. Data from the accelerometer was recorded with an on-board Messring M-bus data acquisition system.

Pre-test and post-test photographs were taken to document the test set-up and the condition of the storage devices. The pre-test and post-test photographs may be found in the appendices of the test report.

CAPE instrumentation systems and post-processing software follow SAE J211-1₅ performance requirements and SAE J1733₆ coordinate systems. Standard calculations and numerical methods for processing safety test instrumentation data acquired during impact tests with instruments installed in ATD's, vehicle structures and laboratory fixtures are processed following SAE J1727₇. The test data plots may be found in the appendices of the test report. On-board high-speed digital imagers were set up to capture the impact event of each sled run. The video files are included with the electronic test report.

Test Requirements

Table 1, SAE J2917₂ Applicable Test Requirements, lists the evaluation parameters for the sled test.

Table 1 – SAE J2917 Applicable Test Requirements

Criteria	Requirement
SAE J2917 Sled Deceleration [g]	Within SAE J2917 Figure 1 Corridor
Sled Delta V [kph (mph)]	49.8 ± 1.6 (31.0 ± 1.0)

Table 2, SAE J2956₃ Applicable Test Requirements, lists the evaluation parameters for the sled test.

Table 2 – SAE J2956 Applicable Test Requirements

Criteria	Requirement
SAE J2956 Sled Deceleration [g]	Within SAE J2956 Figure 1 Corridor
Sled Delta V [kph (mph)]	24.1 ± 1.6 (15.0 ± 1.0)

Table 3, SAE J3044₄ Applicable Test Requirements, lists the evaluation parameters for the sled test.

Table 3 – SAE J3044 Applicable Test Requirements

Criteria	Requirement
SAE J3044 Sled Deceleration [g]	Within SAE J3044 Figure 1 Corridor
Sled Delta V [kph (mph)]	16.1 ± 0.8 (10.0 ± 0.5)

Table 4, SAE J3058₁ Applicable Test Requirements, lists the evaluation parameters for the sled test.

Table 4 – SAE J3058 Applicable Test Requirements

Test Requirement
The closure device shall remain attached to the storage compartment frame.
The storage compartment shall remain attached to the vehicle or simulated vehicle structure.
The storage compartment shall retain the test analogs for the duration of the test.

MEDIX DYNAMIC TESTING:

Cabinet Latch Load Rating [SAE J3058 Compliance]



Center for Advanced Product Evaluation
capetesting.com

CTR14210 Test Matrix

Test Number:	CTR14210	Test Date:	7/20-21/2020
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Customer:	Medix Specialty Vehicles LLC	Test Results: Graphs, pre, and post-test photographs may be found in the Appendix B.
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Test Matrix										
Test #	Test Config.	Load Direction	Sled Pulse	ID	FRAME PN#	Analog Weight [lbs]	# of Analogs	Analogs per shelf	Total Weight [lbs]	Notes
001	A	Transverse	SAE J3044	C1	DR-52-115205-32.5x2	7.5	4	2	30.0	1/2" acrylic, piano hinge,
				C2	DR-52-115205-32.5x2	10.0	4	2	40.0	1/2" acrylic, Austin Hardware F-hinge
				D1	Cargo Net	20.0	2	1	40.0	Analogs placed in cardboard box to prevent bags from going between holes in the net.
				E1	DR-52-115205-21X1	2.5	4	2	10.0	3/8" acrylic, piano hingeX1
002	B,C,D	Longitudinal	SAE J2917	A1	DR-24-114085-4_B x2	7.5	4	2	30.0	3/16" alum, Austin F-HNG X8
				A3	DR-52-115205-24x2	7.5 10.0	4 1	2 1	40.0	1/2" acrylic, piano hingex2
				A4	DR-43-115205-10.75x1	10.0	2	1	20.0	1/4" wood, piano hinge
				A5	Austin FLK slider re-stocker	7.5	4	2	30.0	
				B1	DR-24-114085-4_B x2	10.0	4	2	40.0	3/16" Alum, piano hinge
				B2	DR-52-114085-4_RELx2	7.5	4	2	30.0	1/4" acrylic piano hinge
				B3	Cargo Net	20.0	2	1	40.0	Footman loop x4
				B4	DR-43-115205-10.75x1	5.0	2	1	10.0	1/4" wood, piano hinge
				B5	Austin FLK slider re-stocker	5.0	8	4	40.0	
				F1	DR-52-115370.25	5.0	2	2	10.0	1/4" acrylic, piano hingeX1
F2	DR-52-115370	10.0	2	2	20.0	1/2" acrylic, Austin F-HNGX2				

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Test Matrix													
Test #	Test Config.	Load Direction	Sled Pulse	ID	FRAME PN#	Analog Weight [lbs]	# of Analogs	Analogs per shelf	Total Weight [lbs]	Notes			
003	B,C,D	Transverse	SAE J2956	A1	DR-24-114085-4_B x2	10.0	2	1	20.0	3/16" Alum, Austin F-HNG X8			
				A3	DR-52-115205-24x2	7.5	4	2	30.0	1/2" acrylic, piano hingex2			
				A4	DR-43-115205-10.75x1	10.0	2	1	20.0	1/4" wood, piano hinge			
				A5	Austin FLK slider re-stocker	5.0	4	2	20.0				
				B1	DR-24-114085-4_B x2	7.5	4	2	30.0	3/16" Alum, piano hinge			
				B2	DR-52-114085-4_RELx2	7.5	4	2	30.0	1/4" acrylic piano hinge			
				B3	Cargo Net	20.0	2	1	40.0	Footman loop x4			
				B4	DR-43-115205-10.75x1	5.0	2	1	10.0	1/4" wood, piano hinge			
	A	Longitudinal	SAE J2956	C1	DR-52-115205-32.5x2	7.5	4	2	30.0	1/2" acrylic, piano hinge,			
				C2	DR-52-115205-32.5x2	10.0	4	2	40.0	1/2" acrylic, Austin Hardware F-hinge			
				D1	Cargo Net	20.0	2	1	40.0	Analogs placed in cardboard box to prevent bags from going between holes in the net.			
				E1	DR-52-115205-21x1	5.0	2	1	10.0	3/8" acrylic, piano hingeX1			
				B,C,D	Transverse	SAE J2956	F1	DR-52-115370	5.0	2	2	10.0	1/2" acrylic, Austin F-HNGX2
							F2	DR-52-115370	5.0	4	4	20.0	1/4" acrylic, Austin F-HNGX2

Test #	Test Config.	Load Orientation	Sled Pulse	ID	FRAME PN#	Weight Rating [lbs]	Analogs Retained	Closure Device Remained Attached	Storage Compartment Remained Attached
001	A	Face	SAE J2956	C1	DR-52-115205-32.5x2	30.0	YES	YES	YES
				C2	DR-52-115205-32.5x2	40.0	YES	YES	YES
				D1	Cargo Net	40.0	YES	YES	YES
				E1	DR-52-115205-21X1	10.0	YES	YES	YES
002	B,C,E	Side	SAE J2917	A1	DR-24-114085-4_B x2	20.0	YES	YES	YES
				A3	DR-52-115205-24x2	20.0	YES	YES	YES
				A4	DR-43-115205-10.75x1	10.0	YES	YES	YES
				A5	Austin FLK slider re-stocker	20.0	YES	YES	YES
				B1	DR-24-114085-4_B x2	30.0	YES	YES	YES
				B2	DR-52-114085-4_RELx2	20.0	YES	YES	YES
				B3	Cargo Net	30.0	YES	YES	YES
				B4	DR-43-115205-10.75x1	40.0	YES	YES	YES
				B5	Austin FLK slider re-stocker	10.0	NO	YES	YES
				F1	DR-52-115370.25	10.0	YES	YES	YES
F2	DR-52-115370	30.0	YES	YES	YES				

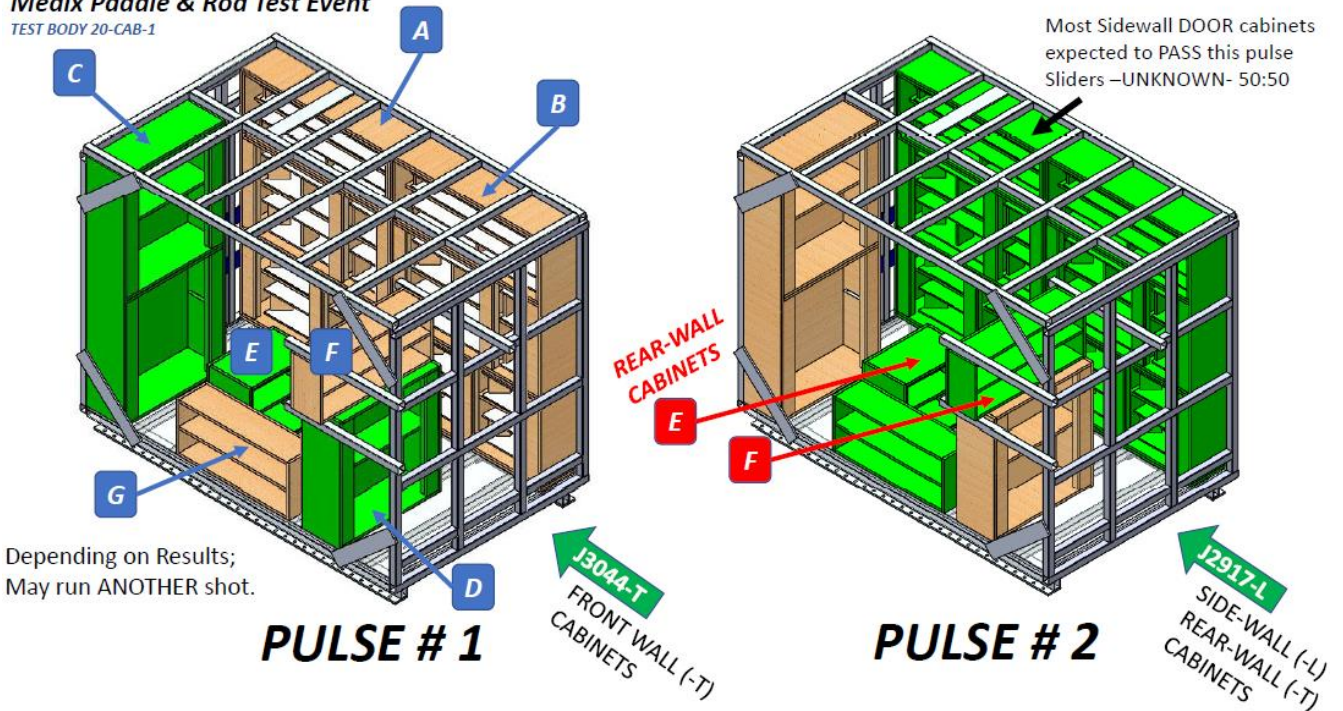
MEDIX DYNAMIC TESTING:

Cabinet Latch Load Rating [SAE J3058 Compliance]



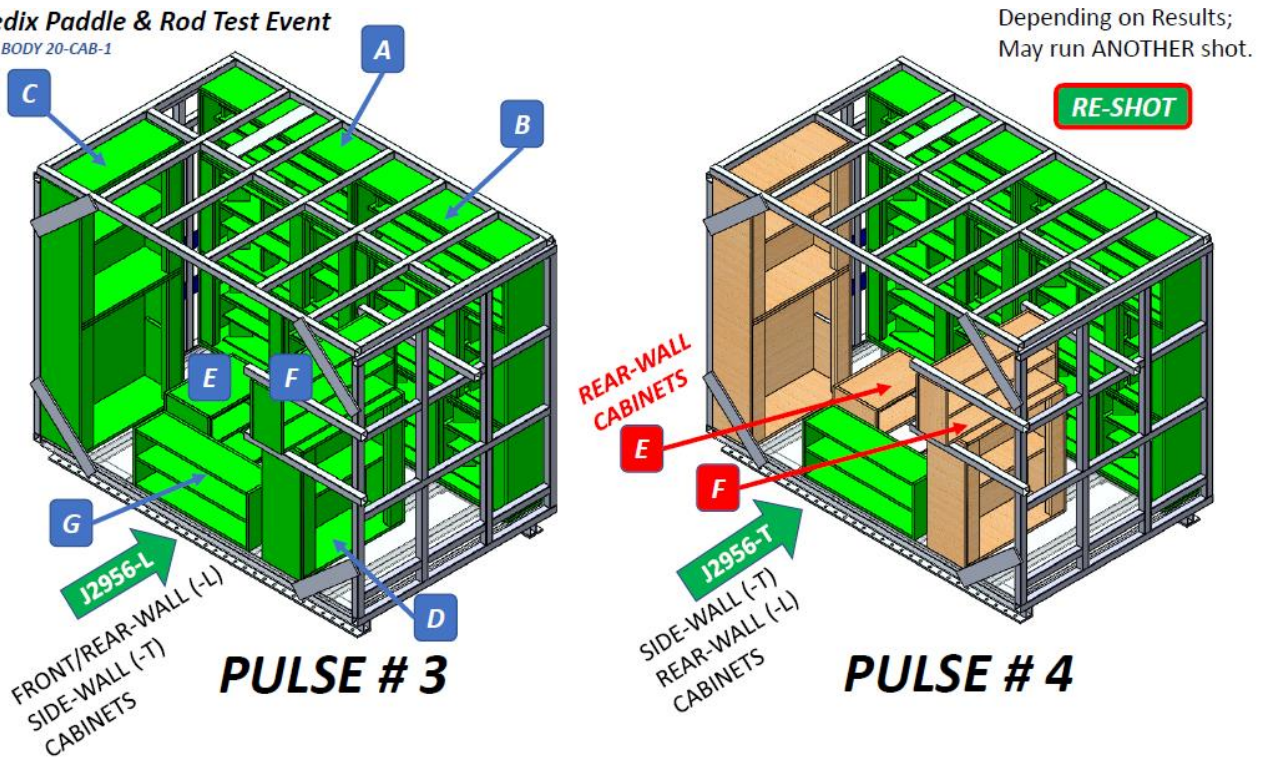
Medix Paddle & Rod Test Event

TEST BODY 20-CAB-1



Medix Paddle & Rod Test Event

TEST BODY 20-CAB-1



MEDIX DYNAMIC TESTING:

Cab Console [SAE J3043 Compliance]



Medix Specialty Vehicles LLC

3008 Mobile Drive

Elkhart IN 46514

This document confirms that CAPE performed testing under project number CTR13801 to SAE J3043 Ambulance Equipment Mount Device or Systems, utilizing Medix supplied Type 1 and Type III storage consoles rated for 12.5 lbs. weight capacity.

Frontal Impact Testing was performed utilizing the longitudinal crash pulse of SAE Recommended Practice J2917 Occupant Restraint and Equipment Mounting Integrity – Frontal Impact System-Level Ambulance Patient Compartment. Side Impact Testing was performed utilizing the transverse crash pulse of SAE Recommended Practice J2956 Occupant Restraint and Equipment Mounting Integrity – Side Impact System-Level Ambulance Patient Compartment. During these tests, all SAE J2917, J2956, and J3043 required test parameters and performance requirements were met and/or exceeded.

Kind Regards,

Ryan W Hoover, PE

CAPE Technical Director








MEDIX DYNAMIC TESTING:

Report References:

TESTING > Dynamic Testing > Medix GEN-DYN-TESTING

Name

-  [CTR14210 Cabinet Door Latching Test Report Rev0.pdf](#)
-  [CTR13801 SAE-J3043 Compliance Console Test Cert Letter](#)
-  [CTR11969 COT Test Report REV0.pdf](#)
-  [CTR11780 M2 STRUCTURE Test Report REV0.pdf](#)
-  [CTR11333 BELTING Test Report Rev0.pdf](#)