

**ARBOC Specialty Vehicles 54.0 kph 214 MDB (Type) Side Impact**  
**TRC Inc. Test No. 170630**

**Prepared By:**  
**Transportation Research Center Inc.**  
**10820 State Route 347**  
**East Liberty, OH 43319**



**Final Report**  
**July 2017**

**Prepared For:**  
**ARBOC Specialty Vehicles**  
**51165 Greenfield Parkway**  
**Middlebury, IN 46540**

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Test Performed By: Mike Postle, Engineering Technician

Report Approved July 26, 2017 by:



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Project Manager

Project: 170281P  
July 26, 2017

170630  


## Purpose

The purpose of this test was to determine the dummy and vehicle response of the subject vehicle, an ARBOC Specialty Vehicles Spirit of Equest Bus, in the 54 kph (target speed) FMVSS 214 (type) left side MDB impact mode conducted for ARBOC Specialty Vehicles by Transportation Research Center Inc. (TRC Inc.).

## Test Procedure

This test was conducted according to instructions provided by ARBOC Specialty Vehicles and the National Highway Traffic Safety Administration's Office of Vehicle Safety Compliance Laboratory Test Procedure TP-214D-09, dated September 2012 as a guide. Data was obtained relative to FMVSS 214 "Dynamic Side Impact Protection."

The test vehicle contained one (1) Part 572U adult male and one (1) Part 572V adult female anthropomorphic test devices (dummies). The dummies were positioned in the left rear outboards designated seating positions and were unrestrained.

<b>ES-2re Injury Criteria</b>	<b>Max. Allowable IARV</b>	<b>Measured Value</b>	<b>Pass/Fail</b>
HIC	1000	2	Pass
Upper Rib Deflection (mm)	44 mm	3.97	Pass
Mid. Rib Deflection (mm)		5.41	Pass
Lower Rib Deflection (mm)		2.41	Pass
Abdominal Load (front) (N)		21.10	
Abdominal Load (mid) (N)		25.48	
Abdominal Load (rear) (N)		28.45	
Sum of Abdomen Forces (kN)	2.5 kN	0.07	Pass
Pubic Symphysis (kN)	6 kN	0.18	Pass

SIDIIs Injury Criteria	Max. Allowable IARV	Measured Value	Pass/Fail
HIC	1000	17	Pass
Upper Thorax Rib Deflection (mm)	38	27.84	Pass
Middle Thorax Rib Deflection (mm)		19.52	Pass
Lower Thorax Rib Deflection (mm)		9.74	Pass
Upper Abdomen Rib Deflection (mm)	45	8.15	
Lower Abdomen Rib Deflection (mm)		12.19	Pass
Lower Spine (T12) Resultant (G's)	82	63.71	Pass
Combined Pelvic Force (N)	5525	4498.03	Pass

#### TEST DUMMY INFORMATION AND CONTACT

Description	Front Occupant	Rear Occupant
Head Contact	Window	Window
Shoulder/Arm Contact	Window	Sidesill panel
Upper Torso Contact	Window frame, Sidewall	Sidewall panel
Lower Torso Contact	None	Sidewall panel
Left Pelvis/Leg Contact	Sidewall panel	Sidewall panel
Left Knee Contact	Sidewall panel	Sidewall panel

The crash event was recorded by nine (9) high speed digital motion picture cameras operating at 1000 frames per second and two (2) real-time documentary video operating at 30 frames per second.

The test data is summarized in Section 2.0. The dummy and camera measurements are presented in Section 3.0. Intrusion measurements are presented in Section 4.0. Appendix A contains the digital still photographs. Appendix B contains the data plots. Appendix C contains the barrier certification.