

**SECTION 4
MASH TEST 3-71 SUMMARY**

Test Article: BR0037 & BR0108
 Test Program: MASH 3-71

Project No. BR0037 & BR0108
 Test Date: 02/10/2021, 3/16/2022

SEQUENTIAL PHOTOGRAPHS

0° Orientation Side View 1 BR0037

90° Orientation Side view 2 BR0108



PLAN VIEW

-15 ft 0 ft 15 ft 30 ft 45 ft 60 ft 75 ft 90 ft 105 ft 120 ft 135 ft 150 ft 165 ft 180 ft 195 ft 210 ft 225 ft 240 ft 255 ft 270 ft 285 ft



Vehicle BR0037 is at 63 MPH when it contacts the sign and it is 5 feet from the point it is released from the tow system (which occurs at 0 feet in scale). Vehicle BR0108 is at 62 MPH when it contacts the sign and it is 25 feet from the point it is released from the tow system.

Vehicle is stopped at 180 feet from the point of initial release from the tow system (which occurs at 0 feet on scale).

SECTION 4... (CONTINUED)
MASHTEST 3-71 SUMMARY

Test Article: Bone Safety Sign-SZ-412

Project No. BR0037 & BR0108

Test Program: MASH 3-71

Test Date: 02/10/2021, 3/16/2022

SUMMARY TABLE

GENERAL INFORMATION		IMPACT CONDITIONS	
TEST AGENCY	Calspan Corporation	IMPACT VELOCITY(0°)	(BR0037) 63.0 mph (101.4 km/h)
TEST NUMBER	Cal BR0037 & BR0108	IMPACT VELOCITY (90°)	(BR0108) 62.0 mph (99.8 km/h)
TEST DESIGNATION	3-71	IMPACT SEVERITY (0°)	442.2 kJ
TEST DATE	02/10/2021, 3/16/2022	IMPACT SEVERITY (90°)	415.5 kJ
		IMPACT LOCATION (0 DEG)	16 in. (406 mm) from Centerline to Psgr
		IMPACT LOCATION (90 DEG)	18.4 in. (467 mm) from Centerline to Drvr
TEST ARTICLE		EXIT CONDITIONS	
NAME / MODEL	Bone Safety SZ-412	EXIT VELOCITY (0°)	(BR0037) 63.0 mph (101.4 km/h)
TYPE	Work-Zone Traffic Control Device	EXIT VELOCITY (90°)	(BR0108) 62.0 mph (99.8 km/h)
KEY ELEMENTS	Springless Stand Powder-coated and zinc plated	FINAL RESTING POSITION	180 ft. downstream
OVERALL HEIGHT	108 in. (2743.2 mm) (With Flags)	VEHICLE STABILITY	Satisfactory
OVERALL WIDTH	63.5 in. (1612.9 mm)	VEHICLE SNAGGING	None
BASE WEIGHT	20 lbs. (9.1 kg)	VEHICLE POCKETING	None
SIGN WEIGHT	< 5 lbs. (2.3 kg)	OCCUPANT RISK VALUES 1	
ROAD SURFACE	Asphalt	OCCUPANT IMPACT VELOCITY	Longitudinal
			Lateral
		RIDEDOWN ACCELERATION	Longitudinal
			Lateral
TEST VEHICLE		TEST ARTICLE POST-IMPACT	
TYPE / DESIGNATION	1100C	ARTICLE DAMAGE	Base Deformation/Upper separation
YEAR , MAKE AND MODEL	2014 Kia Rio & 2016 Nissan Versa		
CURB MASS	BR0037 2530 lbs. (1148 kg) BR0108 2339 lbs. (1061 kg)	VEHICLE DAMAGE	
TEST INERTIAL MASS	BR0037 2458 lbs. (1115 kg) BR0108 2385 lbs. (1082 kg)	VEHICLE DAMAGE SCALE	FL-1; FR-2
GROSS STATIC MASS	BR0037 2458. lbs. (1115 kg) BR0108 2385. lbs. (1082 kg)	COLLISION DAMAGE CLASSIFICATION	12FLEN01 12FREN01
		MAXIMUM DEFORMATION	.4" (10.2 mm) Foot well

¹Values not calculated due to test article weight being less than 220 lbs. (100 kg)

SECTION 4

MASH TEST 3-72 SUMMARY

Test Article: Bone Safety Sign-SZ-412

Project No. BR0048

Test Program: MASH 3-72

Test Date: 2/19/2021

SEQUENTIAL PHOTOGRAPHS

0° Orientation Side View 1



0.000s



0.030s



0.060s



0.000s



0.030s



0.060s

90° Orientation Side View 2

PLAN VIEW

-15 ft 0 ft 15 ft 30 ft 45 ft 60 ft 75 ft 90 ft 105 ft 120 ft 135 ft 150 ft 165 ft 180 ft 195 ft 210 ft 225 ft 240 ft 255 ft 270 ft



The vehicle is at 61.8 MPH when it contacts first sign and it is 5 feet from the point it is released from the tow system (which occurs at 0 feet on scale).



Vehicle is stopped at 186 feet from the point of initial release from the tow system (which occurs at 0 feet on scale).

SECTION 4... (CONTINUED)
MASHTEST 3-72 SUMMARY

Test Article: Bone Safety Sign-SZ-412
 Test Program: MASH 3-72

Project No. BR0048
 Test Date: 2/19/2021

SUMMARY TABLE

GENERAL INFORMATION		IMPACT CONDITIONS	
TEST AGENCY	Calspan Corporation	IMPACT VELOCITY (0°)	61.8 mph (99.5 km/h)
TEST NUMBER	BR0048	IMPACT VELOCITY (90°)	60.7 mph (97.7 km/h)
TEST DESIGNATION	3-72	KINETIC ENERGY (0°)	869.3 kJ
TEST DATE	2/19/2021	KINETIC ENERGY (90°)	838.7 kJ
		IMPACT LOCATION (0 DEG)	17.9 in. (455 mm) from Centerline to Psgr
		IMPACT LOCATION (90 DEG)	19.0 in. (483 mm) from Centerline to Drvr
TEST ARTICLE		EXIT CONDITIONS	
NAME / MODEL	Bone Safety SZ-412	EXIT VELOCITY (0°)	61.8 mph (99.5 km/h)
TYPE	Work-Zone Traffic Control Device	EXIT VELOCITY (90°)	60.7 mph (97.7 km/h)
KEY ELEMENTS	Springless Stand Powder-coated and zinc plated	FINAL RESTING POSITION	186 ft. downstream
OVERALL HEIGHT	108 in. (2743.2 mm) (With Flags)	VEHICLE STABILITY	Satisfactory
OVERALL WIDTH	63.5 in. (1612.9 mm)	VEHICLE SNAGGING	None
BASE WEIGHT	20 lbs. (9.1 kg)	VEHICLE POCKETING	None
SIGN WEIGHT	< 5 lbs. (2.3 kg)	OCCUPANT RISK VALUES	
ROAD SURFACE	Asphalt	OCCUPANT IMPACT VELOCITY	Longitudinal
			Lateral
TEST VEHICLE		RIDEDOWN ACCELERATION	Longitudinal
TYPE / DESIGNATION	2270P		Lateral
YEAR, MAKE AND MODEL	2009 Dodge Ram 1500		
CURB MASS		TEST ARTICLE POST-IMPACT	
	5022.2 lbs. (2278 kg)	ARTICLE DAMAGE	Base Deformation/Upper separation
TEST INERTIAL MASS		VEHICLE DAMAGE	
	5022.2 lbs. (2278 kg)	VEHICLE DAMAGE SCALE	FL-1 ; FR-1
GROSS STATIC MASS		COLLISION DAMAGE CLASSIFICATION	12FLEN01 12FREN01
	5022.2 lbs. (2278 kg)	MAXIMUM DEFORMATION	0 inches

¹Values not calculated due to test article weight being less than 220 lbs. (100 kg)