

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

Test Article: SZ-412-S
 Test Program: MASH 3-71

Project No. BR0038
 Test Date: 2/12/2021 & 03/4/2021

SEQUENTIAL PHOTOGRAPHS

0° Orientation Side View 1



0.000s 0.030s 0.060s

90° Orientation Side View 2



0.000s 0.030s 0.060s

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

BR0038 2/12/2021



BR0038 3/4/2021



Vehicle Stopped



Vehicle is at 63.8 MPH (2/12/2021) and 62 MPH (3/4/2021) 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)

Both vehicles are stopped at 185 feet from the point of initial release from the Two Systems (which occurs at 0 feet on scale)

SECTION 4... (CONTINUED)

MASHTEST 3-71SUMMARY

Test Article: SZ-412-S

Project No. BR0038

Test Program: MASH 3-71

Test Date: 2/12/2021 & 03/4/2021

SUMMARY TABLE

GENERAL INFORMATION		IMPACT CONDITIONS	
TEST AGENCY	Calspan Corporation	IMPACT VELOCITY(0°)	63.8 mph (102.9 km/h)
TEST NUMBER	Cal BR0038	IMPACT VELOCITY (90°)	62.0 mph (99.8 km/h)
TEST DESIGNATION	3-71	IMPACT SEVERITY (0°)	451.0 KJ
TEST DATE	2/12/2021 & 3/4/2021	IMPACT SEVERITY (90°)	428.2 KJ
		IMPACT LOCATION (0 DEG)	535 mm (21.1 in) from Centerline to Psgr
		IMPACT LOCATION (90 DEG)	440 mm (17.3 in) from Centerline to Drvr
TEST ARTICLE		EXIT CONDITIONS	
NAME / MODEL	SZ-412-S Spring Stand	EXIT VELOCITY (0°)	63.8 mph (102.9 km/h)
TYPE	Work-Zone Traffic Control Device	EXIT VELOCITY (90°)	62.0 mph (99.8 km/h)
KEY ELEMENTS	Single coil spring Powder -coated and zinc plated for maximum corrosion resistance	FINAL RESTING POSITION	180 ft. downstream
OVERALL HEIGHT	112 in. (2844.8 mm)	VEHICLE STABILITY	Satisfactory
OVERALL WIDTH	48.25 in. (1225.5 mm)	VEHICLE SNAGGING	None
BASE WEIGHT	23 lbs. (10.43 kg)	VEHICLE POCKETING	None
SIGN WEIGHT	< 5 lbs. (2.27 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		
CURB MASS	BR0038 2/12/2021 2526.5 lbs. (1146 kg) BR0038 3/4/2021 2530.9 lbs. (1148 kg)	VEHICLE DAMAGE	
TEST INERTIAL MASS	BR0038 2/12/2021 2445 lbs. (1109 kg) BR0038 3/4/2021 2458 lbs. (1115 kg)	VEHICLE DAMAGE SCALE	FL-1 ; FR-2
GROSS STATIC MASS	BR0038 2/12/2021 2445 lbs. (1109 kg) BR0038 3/4/2021 2458 lbs. (1115 kg)	COLLISION DAMAGE CLASSIFICATION	12FLEN01 12FREN01
		MAXIMUM DEFORMATION	0.0 inches

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

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

Test Article: SZ-412-S
Test Program: MASH 3-72

Project No. BR0049
Test Date: 3/2/2021

SUMMARY TABLE

GENERAL INFORMATION		IMPACT CONDITIONS	
TEST AGENCY	Calspan Corporation	IMPACT VELOCITY (0°)	61.6 mph (99.1 km/h)
TEST NUMBER	BR0049	IMPACT VELOCITY (90°)	60.7 mph (97.7 km/h)
TEST DESIGNATION	3-72	KINETIC ENERGY (0°)	863.7 KJ
TEST DATE	3/2/2021	KINETIC ENERGY (90°)	838.7 KJ
		IMPACT LOCATION (0 DEG)	490 mm (19.3 in) from Centerline to Drvr
		IMPACT LOCATION (90 DEG)	499 mm (19.6 in) from Centerline to Psgr
TEST ARTICLE		EXIT CONDITIONS	
NAME / MODEL	SZ-412-S Spring Stand	EXIT VELOCITY (0°)	61.6 mph (99.1 km/h)
TYPE	Work-Zone Traffic Control Device	EXIT VELOCITY (90°)	60.7 mph (97.7 km/h)
KEY ELEMENTS	Single coil spring Powder -coated and zinc plated for maximum corrosion resistance	FINAL RESTING POSITION	186 ft. downstream
OVERALL HEIGHT	112 in. (2844.8 mm)	VEHICLE STABILITY	Satisfactory
OVERALL WIDTH	48.25 in. (1225.5 mm)	VEHICLE SNAGGING	None
BASE WEIGHT	23 lbs. (10.43 kg)	VEHICLE POCKETING	None
SIGN WEIGHT	< 5 lbs. (2.27 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	5022 lbs. (2278 kg)	TEST ARTICLE POST-IMPACT	
		ARTICLE DAMAGE	Base Deformation/ Upper Separation
TEST INERTIAL MASS	5022 lbs. (2278 kg)	VEHICLE DAMAGE	
		VEHICLE DAMAGE SCALE	FL-1 ; FR-1
GROSS STATIC MASS	5022 lbs. (2278 kg)	COLLISION DAMAGE CLASSIFICATION	12FLEN01 12FREN01
		MAXIMUM DEFORMATION	0.0 inches

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