

REPORT NUMBER: SINCAP-MGA-2015-040

**NEW CAR ASSESSMENT PROGRAM (NCAP)
Moving Deformable Barrier Side Impact Test**

**FORD MOTOR COMPANY
2015 Ford Expedition XLT SUV
NHTSA No.: M20150212**

**MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105**



Test Date: December 10, 2014

Final Report Date: February 19, 2015

FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NVS-111
1200 New Jersey Ave, SE
Room W43-410
Washington, DC 20590**

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Approved by: 
Ben Fischer, Project Engineer

Approval Date: February 19, 2015

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

Technical Report Documentation Page

1. Report No. SINCAP-MGA-2015-040	2. Government Accession No.	3. Recipient's Catalog No.																																																					
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact MDB Testing of 2015 Ford Expedition XLT SUV, NHTSA No.: M20150212		5. Report Date February 19, 2015																																																					
		6. Performing Organization Code MGA																																																					
7. Author(s) Donna Janovicz, Project Manager Ben Fischer, Project Engineer		8. Performing Organization Report No. SINCAP-MGA-2015-040																																																					
9. Performing Organization Name and Address MGA Research Corporation 5000 Warren Road Burlington, WI 53105		10. Work Unit No.																																																					
		11. Contract or Grant No. DTNH22-09-D-00124																																																					
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C. 20590		13. Type of Report and Period Covered: Final Test Report December 10, 2014 to February 19, 2015																																																					
		14. Sponsoring Agency Code NVS-111																																																					
15. Supplementary Notes																																																							
16. Abstract A 55/28 km/h 90° Moving Deformable Barrier NCAP Side Impact Test was conducted on the 2015 Ford Expedition XLT SUV in accordance with the specifications of the Office of Crashworthiness Standards NCAP Side Laboratory Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at MGA Research Corporation in Burlington, Wisconsin on December 10, 2014. The impact velocity of the Moving Deformable Barrier (MDB) was 61.9 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.9° C. The target vehicle post-test maximum crush was 171 mm at level 1. The test vehicle's performance was as follows: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4">Driver ATD (ES-2re)</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>16</td> </tr> <tr> <td>Maximum Thorax Rib Deflection</td> <td>mm</td> <td>44</td> <td>16</td> </tr> <tr> <td>Total Abdominal Force</td> <td>N</td> <td>2500</td> <td>283</td> </tr> <tr> <td>Pubic Symphysis Force</td> <td>N</td> <td>6000</td> <td>567</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="4">Passenger ATD (SID-IIs)</th> </tr> <tr> <th>Measurement Description</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td>N/A</td> <td>1000</td> <td>65</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>Gs</td> <td>82</td> <td>19</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>974</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38*</td> <td>13</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45*</td> <td>17</td> </tr> </tbody> </table>				Driver ATD (ES-2re)				Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	16	Maximum Thorax Rib Deflection	mm	44	16	Total Abdominal Force	N	2500	283	Pubic Symphysis Force	N	6000	567	Passenger ATD (SID-IIs)				Measurement Description	Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)	N/A	1000	65	Resultant Lower Spine Acceleration	Gs	82	19	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	974	Maximum Thoracic Rib Deflection	mm	38*	13	Maximum Abdomen Rib Deflection	mm	45*	17
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17. Key Words New Car Assessment Program (NCAP) Side Impact MDB ES-2re SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																																																					
19. Security Classification of Report Unclassified	20. Security Classification of Page Unclassified	21. No. of Pages 223	22. Price																																																				

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SECTION 1

TEST PURPOSE AND PROCEDURE

This moving deformable barrier side impact test is part of the MY 2015 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-09-D-00124. The purpose of this test is to generate comparative side impact performance in a 2015 Ford Expedition XLT SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Laboratory Test Procedure dated September 2013.

SECTION 2 SUMMARY OF TEST RESULTS

A 2015 Ford Expedition XLT SUV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.9 km/h. The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by MGA Research Corporation in Burlington, Wisconsin on December 10, 2014. Pre-test and post-test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS NCAP Side Laboratory Test Procedure dated September 2013. The side impact event was documented by eleven (11) cameras. Camera locations are included in this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Primary and Redundant Head CG Triaxial Accelerometers
Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
Abdomen Forward, Middle, and Rear Y-Axis Load Cells
Lower Spine (T12) Triaxial Accelerometers
Pubic Symphysis Y-Axis Load Cell

PASSENGER ATD (SID-IIs)

Primary and Redundant Head CG Triaxial Accelerometers
Chest Upper Rib, Middle Rib, and Lower Rib Y-Axis Displacement Potentiometers
Abdomen Upper Rib and Lower Rib Y-Axis Displacement Potentiometers
Lower Spine (T12) Triaxial Accelerometers
Acetabulum and Iliac Wing Y-Axis Load Cells

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D contains the test equipment and instrumentation calibration data.

Dummy Injury readings were recorded as follows:

DUMMY INJURY VALUES

	Driver ATD (ES-2re)		
Measurement Description	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	16
Maximum Thorax Rib Deflection	mm	44	16
Total Abdominal Force	N	2500	283
Pubic Symphysis Force	N	6000	567

	Passenger ATD (SID-IIs)		
Measurement Description	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)	N/A	1000	65
Resultant Lower Spine Acceleration	Gs	82	19
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	974
Maximum Thoracic Rib Deflection	mm	38*	13
Maximum Abdomen Rib Deflection	mm	45*	17

*Proposed IARV

Supplemental restraint information is given below:

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No			
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	
Other				

The test data can be found on the NHTSA website at www.nhtsa.dot.gov

GENERAL COMMENTS

Left Lower B-Post Y has no valid data after 12 ms.

Left Mid B-Post Y has no valid data after 9 ms.

Top of Engine Y has no valid data.

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 3
OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
Test Date: 12/10/2014

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20150212	Traction Control System (TCS)	Yes
Model Year	2015	Auto-Leveling System	No
Make	Ford	Automatic Door Locks (ADL)	Yes
Model	Expedition	Power Window Auto-Reverse	Yes
Body Style	SUV	Heavy Duty Trailer Tow Pkg.	Yes
VIN	1FMJU1HT5FEF01552	Driver Front Airbag	Yes
Body Color	Blue Jeans Metallic	Driver Curtain Airbag	Yes
Odometer Reading (km/mi)	53 / 33	Driver Head/Torso Airbag	No
Engine Displacement (L)	3.5	Driver Torso Airbag	Yes
Type/No. Cylinders	6	Driver Torso/Pelvis Airbag	No
Engine Placement	Longitudinal	Driver Pelvis Airbag	No
Transmission Type	Automatic	Driver Knee Airbag	No
Transmission Speeds	6	Rear Pass. Curtain Airbag	Yes
Overdrive	Yes	Rear Pass. Head/Torso Airbag	No
Final Drive	Rear	Rear Pass. Torso Airbag	No
Roof Rack	Yes	Rear Pass. Torso/Pelvis Airbag	No
Sunroof/T-Top	No	Rear Pass. Pelvis Airbag	No
Running Boards	Yes	Driver Seat Belt Pretensioner	Yes
Tilt Steering Wheel	Yes	Rear Pass. Seat Belt Pretensioner	No
Power Seats	Driver Only	Driver Load Limiter	Yes
Anti-Lock Brakes (ABS)	Yes	Rear Pass. Load Limiter	No
		Other Restraint Feature	N/A

Does owner's manual provide instruction to turn off automatic door locks?	Yes
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DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Company	GVWR (kg)	3293
Date of Manufacture	09/14	GAWR Front (kg)	1497
Vehicle Type	MPV	GAWR Rear (kg)	1928

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	3	8	
Capacity Weight (VCW) (kg)				686	(A)
DSC x 68.04 kg				544	(B)
Rated Cargo and Luggage Weight (RCLW)				142	(A-B)

VEHICLE SEAT TYPE

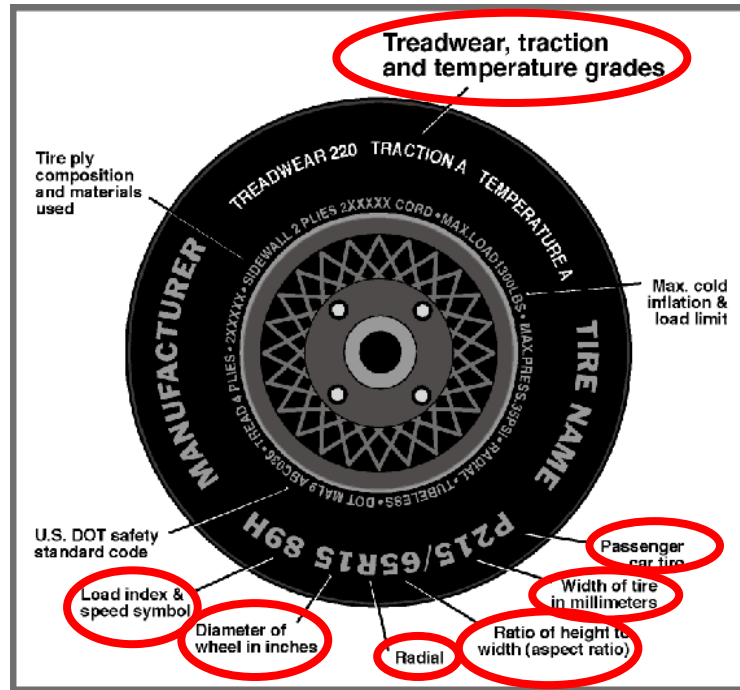
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						Manual	Power
Front Seat	X					w/lever	
Rear or Second Row			X			w/lever	
Third Row Seat			X		X		

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014

VEHICLE TIRE INFORMATION



Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	255	255
Recommended Tire Size	275/65R18	275/65R18
Tire Size on Vehicle	275/65R18	275/65R18
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler	Wrangler
Treadwear	680	680
Traction	A	A
Temperature Grade	B	B
Tire Plies Sidewall	2 polyester	2 polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Polyamide	2 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	116T	116T
Tire Material	Rubber	Rubber
DOT Safety Code Left	4BYJ JEIR 3214	4BYJ JEIR 1414
DOT Safety Code Right	4BYJ JEIR 3214	4BYJ JEIR 1314

DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014

TEST PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	283	283	283	276
Tire Placard	kPa	255	255	255	255
Owner's Manual	kPa				
As Tested	kPa	255	255	255	255

MDB TIRE SPECIFICATIONS

	Requirement	Units	LF	RF	LR	RR
Tire Size	P205/75R15	N/A	P205/75R15	P205/75R15	P205/75R15	P205/75R15
Tire Pressure	200 ± 21	kPa	200	200	200	200

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	620.5	668.0		646.0	807.5		665.0	803.0	
Right	kg	621.0	657.0		624.0	747.5		610.0	753.5	
Ratio	%	48.4	51.6		45.0	55.0		45.0	55.0	
Totals	kg	1241.5	1325.0	2566.5	1270.0	1555.0	2825.0	1275.0	1556.5	2831.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2566.5	(A)
Sum of Actual Weight of 2 P572 ATDs Used	kg	129.3	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	136	(C)
Calculated Test Vehicle Target Weight (TVTW)	kg	2831.8	(A+B+C)

Does the measured As Tested Vehicle Weight lie within the required weight range (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to 9 kg)? **YES**

TEST VEHICLE ATTITUDES AND CG

	Units	Fully Loaded	As Tested	Meets Requirement***
Left Front	mm	913	916	Yes
Right Front	mm	916	925	Yes
Right Rear	mm	890	884	Yes
Left Rear	mm	880	881	Yes
Vehicle CG (Aft of Front Axle)	mm	1656	1658	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	31	25	

*** The "As Tested" vehicle attitude measurements must be equal to or within ± 10 mm of the "Fully Loaded" vehicle attitude measurements at each wheel well.

Test height adjustable suspension setting, if applicable:	Not Applicable
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DATA SHEET NO. 1 (CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
Test Date: 12/10/2014

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Weight of Ballast, if any	116.1
Rear bumper cover	4.1

DATA SHEET NO. 2
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	25.7	7.7	16.7
Front Passenger Seat	Fixed	Fixed	Fixed
Front Center Seat			
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCR Height (mm)	SCR Height Position	SCR Height (mm)		
				Rear- most	Mid- Fore/Aft	Forward- Most
Driver Seat	16.7	0	Max	44	44	44
			Mid	22	22	22
			Min	0	0	0
Front Passenger Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Front Center Seat			Max			
			Mid			
			Min			
Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Max	Fixed	Fixed	Fixed
			Mid	Fixed	Fixed	Fixed
			Min	Fixed	Fixed	Fixed

DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

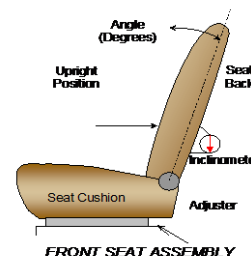
NHTSA No. M20150212
 Test Date: 12/10/2014

SEAT FORE/AFT POSITIONS

Seat	Total Fore/Aft Travel		Test Position from Forward-most Position	
	mm	Detents	mm	Detent
Driver Seat	220		110	
Front Passenger Seat	220	23 (1 st as 1)	110	11 th (1 st as 0)
Front Center Seat				
Struck Side Rear Seat	Fixed	Fixed	Fixed	Fixed
Non-Struck Side	Fixed	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed	Fixed

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned to the manufacturer's designated design angle. The front passenger's seat back is positioned in a similar manner as the driver's seat back. The struck side rear seat back is adjusted following Appendix C, "Positioning Dummies in the Test Vehicle" in the NCAP Laboratory Test Procedure dated September 2013. The rear center and non-struck side rear outboard seat backs are positioned to match the struck side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Vertical	
	Degrees	Detents	Degrees	Detent
Driver Seat w/Seated Dummy	55.9	29 (1 st as 1)	9.4	6 th (1 st as 0)
Front Passenger Seat	55.3	29 (1 st as 1)	9.6	8 th (1 st as 0)
Front Center Seat				
Struck Side Rear Seat	18.0	7 (1 st as 1)	20.5	0 th (1 st as 0)
Non-Struck Side Rear Seat	18.0	7 (1 st as 1)	20.5	0 th (1 st as 0)
Rear Center Seat	18.0	7 (1 st as 1)	20.5	0 th (1 st as 0)

Driver seat back angle measured on headrest post.
 Left Rear Passenger seat back angle measured on seatback.

DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1.

	Total # of Positions	Placed in Position #
Driver Seat	5 detents (1 st as 1)	2 nd (uppermost as 0)
Rear Seat	Fixed	Not Applicable

HEAD RESTRAINT ADJUSTMENT

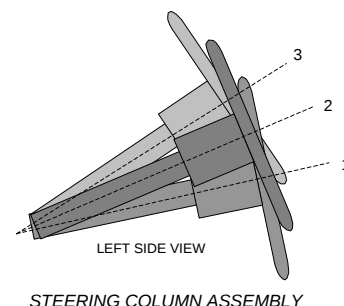
The driver's head restraint is adjusted to the highest and most full forward in-use position. The struck-side rear passenger's head restraint is adjusted to the lowest and most full forward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	3	Highest
Rear Seat	Fixed	Not Applicable

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

	Degrees	Fore/Aft Position (mm)
Lowermost, Position 1	70.8	250
Geometric Center, Position 2	68.9	225
Uppermost, Position 3	67.0	200
Telescoping Steering Wheel Travel		50
Test Position	68.9	225

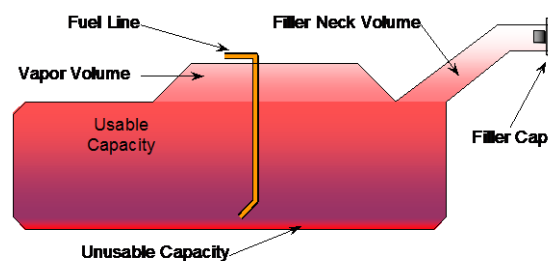


STEERING COLUMN ASSEMBLY

FUEL PUMP

Describe the fuel pump type, details about how it operates and the location of the fuel filler pipe.

The vehicle is equipped with an electric fuel pump. The electric fuel pump operates for 3 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 3 seconds following ignition actuation, the fuel pump will shut off. The fuel pump operates continuously while the engine is running; if the engine stalls, the fuel pump is deactivated. Also a fuel pump shut-off system is provided and designed to stop fuel flow to the engine if the vehicle sustains an impact above a certain magnitude. The fuel pipe is on the left side.



VEHICLE FUEL TANK ASSEMBLY

DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEM DATA

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014

FUEL TANK CAPACITY DATA

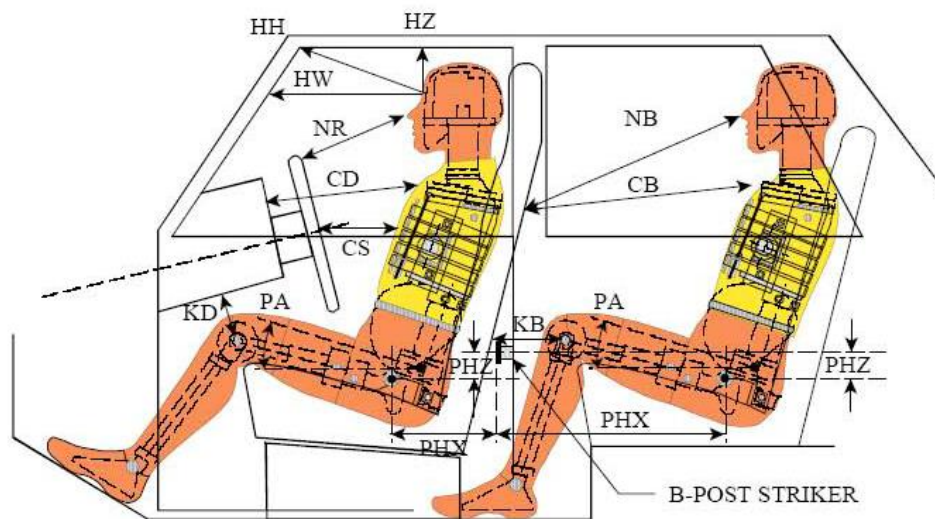
	Liters
Usable Capacity of "Standard" Tank (see Form No. 1)	106.0
Usable Capacity of "Optional" Tank (see Form No. 1)	
Usable Capacity of Standard Tank as Specified in Owner's Manual	106.0
Usable Capacity of Optional Tank as Specified in Owner's Manual	
93% of Usable Capacity	98.6
Actual Amount of Solvent Used	98.4
1/3 of Usable Capacity	35.3

Is the actual amount of solvent used in the test equal to 93% $\pm$ 1%
 of the Usable Capacity stated in Form No. 1? **YES**

DATA SHEET NO. 3 DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
Test Date: 12/10/2014



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
REAR DUMMY PHX & PHZ
MEASUREMENTS FOR A 4-DOOR
VEHICLE WOULD USE THE C-POST
STRIKER AS A REFERENCE POINT

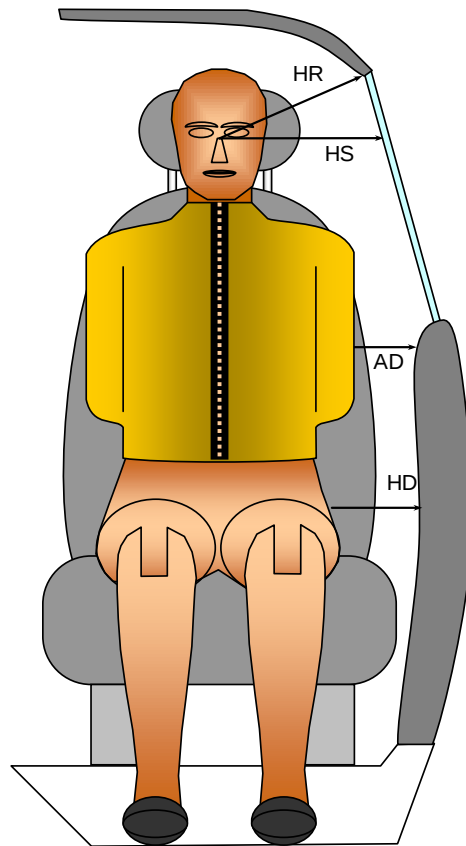
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length (mm)	Angle(°)	Length (mm)	Angle(°)
HH		Head to Header	402	17.7		
HW		Head to Windshield	611			
HZ	HZ	Head to Roof Liner	179		310	
NR	NB	Nose to Rim/Seat Back	430	13.6	575	14.2
CD	CB	Chest to Dashboard/Seat Back	586	4.5	583	10.7
CS		Chest to Steering Wheel	385	12.1		
KDL	KBL	Left Knee to Dash/Seat Back	164	16.8	281	1.5
KDR	KBR	Right Knee to Dash/Seat Back	170	16.4	284	0.8
PAX	PAX	Pelvic Tilt Angle X		18.7		24.6
	PAY	Pelvic Tilt Angle Y		-0.8		-0.8
PHX	PHX	Hip Point to Striker (X-Axis)	206		306	
PHZ	PHZ	Hip Point to Striker (Z-Axis)	1		122	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
Test Date: 12/10/2014



FRONT VIEW OF DUMMY

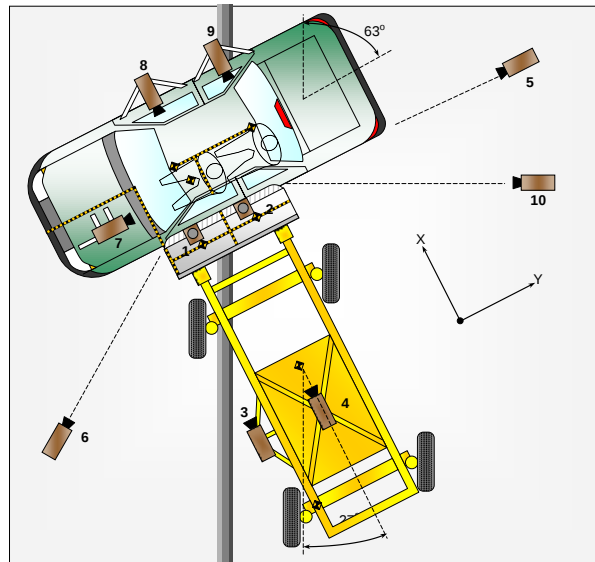
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	176	288
HS	Head to Side Window	mm	309	394
AD	Arm to Door	mm	94	148
HD	Hip Point to Door	mm	129	175

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
Test Date: 12/10/2014



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X*	Y*	Z*		
1	Overhead Overall	-130	160	-5050	14	1000
2	Overhead Close-Up	60	40	-5050	20	1000
3	Left Impact Point (MDB)				50	1000
4	Side Overall (MDB)				16	1000
5	Rear	70	5020	-1120	24	1000
6	Left Front	4260	-4910	-1160	24	1000
7	Driver Front (OB)				16	1000
8	Driver Side (OB)				8	1000
9	Passenger Side (OB)				8	1000
10	Real Time Left Rear					30
11	Real Time Inrun					30

Reference: Impact Point projected to Ground; +X = To Front of MDB, +Y = To Right of MDB, +Z = Down

* All measurements accurate to ± 6 mm

Explain why camera(s) did not operate as intended: None

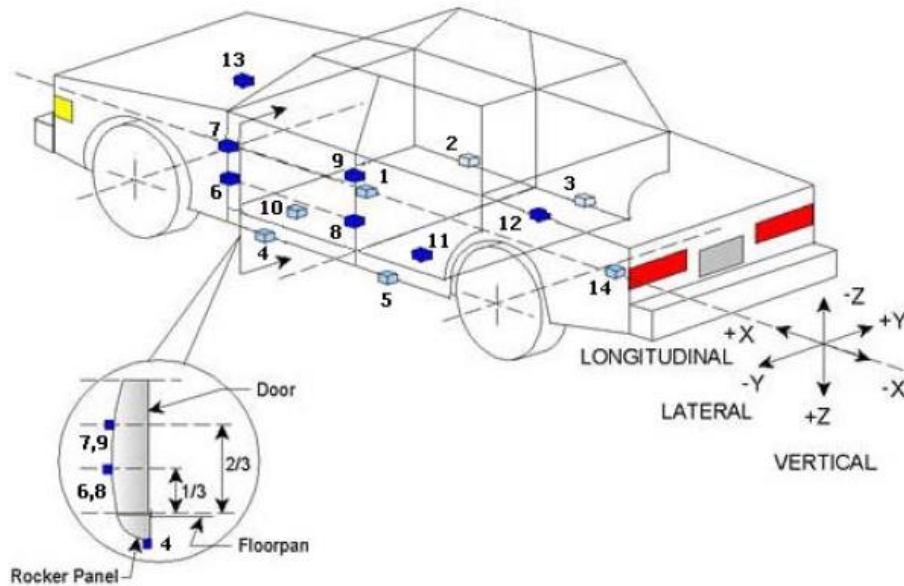
INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Passenger Dummy	16
Vehicle Structure	23
MDB Accelerometers	5
MDB Contacts	2
Total	62

DATA SHEET NO. 6 **TEST VEHICLE ACCELEROMETER LOCATIONS**

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014



TEST VEHICLE ACCELEROMETER LOCATIONS

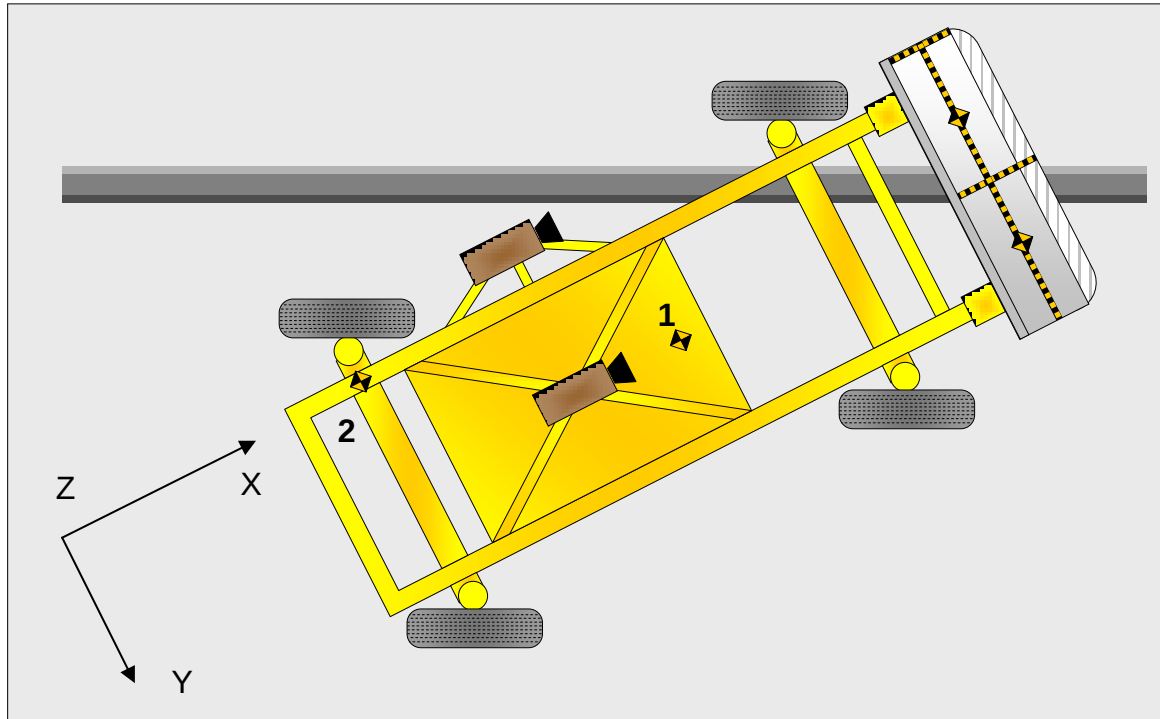
Accelerometer Location				
No.	ID	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2613	-30	-615
2	Right Sill at Front Seat	2422	865	-465
3	Right Sill at Rear Seat	1685	836	-480
4	Left Sill at Front Door	2833	-855	-462
5	Left Sill at Rear Door	2013	-830	-478
6	Left Lower A-Post	3510	-888	-828
7	Left Middle A-Post	3485	-877	-1052
8	Left Lower B-Post	2368	-827	-893
9	Left Middle B-Post	2373	-826	-1038
10	Front Seat Track	2569	-445	-588
11	Rear Seat Structure	2025	-445	-610
12	Rt. Rear Occ. Compartment	2114	460	-603
13	Engine Block	3915	-20	-1035
14	Rear Above Axle	660	0	-760

Reference: X – Rear Surface of Vehicle (+ forward)
 Y - Vehicle Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 7
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1105	0	-330
2	MDB Rear	-2580	-650	-625

Reference: X - MDB Face (+ forward)
 Y - MDB Centerline (+ to right)
 Z - Ground Plane (+ down)

DATA SHEET NO. 8
POST-TEST OBSERVATIONS

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
Test Date: 12/10/2014

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Face	Curtain Airbag	None
Top of Head	Curtain Airbag, Headliner	Curtain Airbag
Left Side of Head	Curtain Airbag	Curtain Airbag
Back of Head	Curtain Airbag, Headrest	Curtain Airbag, Headrest
Left Shoulder	Curtain Airbag	Door Panel
Upper Torso	Seatback	None
Lower Torso	Side Airbag, Seatback	Door Panel
Left Hip	Seatpan	Door Panel
Left Knee	Door Panel	Door Panel

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Record Width of Opening at Striker (mm)	N/A	N/A	N/A	N/A	N/A

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	Fixed	No	Fixed
Seat Disengagement from Floor Pan	No	Fixed	No	Fixed
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No Separation
Sill Separation	None
Windshield Damage	Cracked
Side Window Damage	None
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST-TEST OBSERVATIONS

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
Test Date: 12/10/2014

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	No			
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes		No	
Other				

IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vehicle Wheel Base	mm		3012
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		508
Actual Impact Point (Aft of Front Axle)	mm		506
Horizontal Offset (+forward / -rearward)	mm	+/- 50 of intended impact point	+2
Vertical Offset (+down / -up)	mm	+/- 20 of intended impact point	+6

DATA SHEET NO. 9
MDB SUMMARY OF RESULTS

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
Test Date: 12/10/2014

MDB SPECIFICATIONS

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1251
Overall Length Including Honeycomb Face	4115
Wheelbase of Framework Carriage	2595
CG Location aft of Front Axle	1134

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	390.0	300.1	
Right	kg	376.8	294.7	
Ratio	%	56.3	43.7	
Totals	kg	766.8	594.8	1361.6

SPEED AND ANGLE AT IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.9
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.0
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	90.2
MDB Forward Line of Motion to Target Vehicle CL	degrees	62.5 to 63.5	62.7
MDB Crabbed Angle to MDB Forward Line of Motion	degrees	26 to 28	27.1

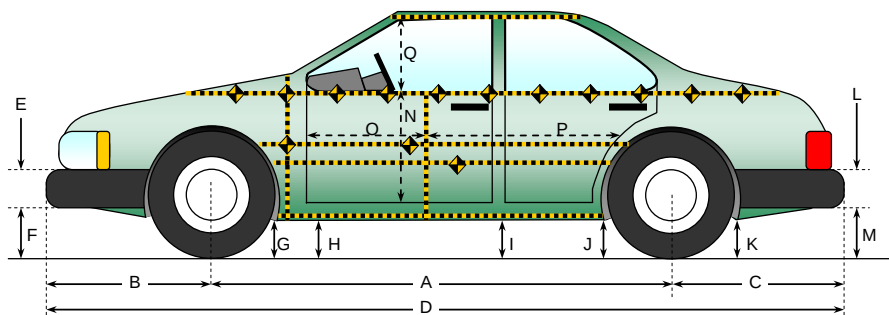
MAXIMUM STATIC CRUSH OF HONEYCOMB IMPACT FACE

Vertical Location			From Centerline		Maximum Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	700	Right	196
B	Top of Bumper	533	800	Right	259
C	Mid-Level	686	800	Right	252
D	Top of Stack	813	800	Right	239

DATA SHEET NO. 10
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
Test Date: 12/10/2014



All measurements in (mm) with tolerance of ± 3 mm

LEFT SIDE VIEW

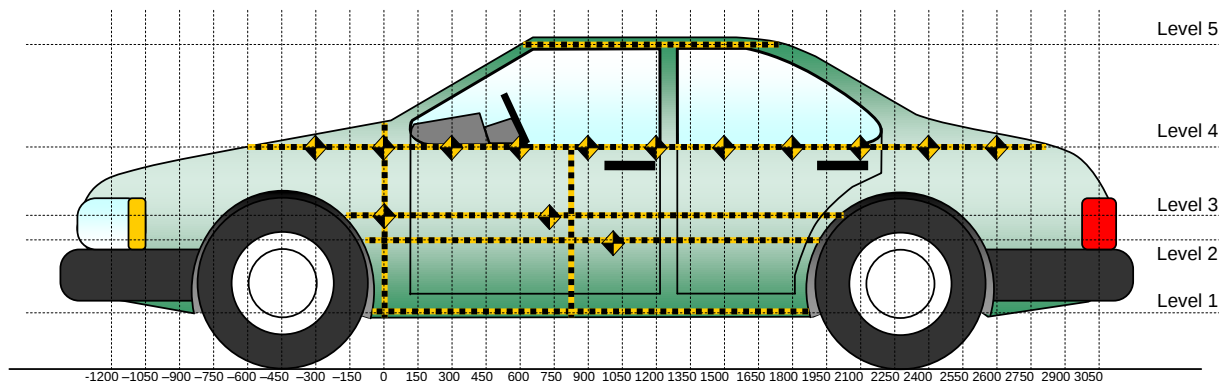
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3012	3007	5
B	Front Axle to FSOV	992	1002	-10
C	Rear Axle to RSOV	1226	1220	6
D	Total Length at Centerline	5230	5229	1
E	Front Bumper Thickness	95	95	0
F	Front Bumper Bottom to Ground	340	350	-10
G	Sill Height at Front Wheel Well	393	429	-36
H	Sill Height at Front Door Leading Edge	387	416	-29
I	Sill Height at B Pillar	406	403	3
J1	Sill Height at Rear Wheel Well	406	412	-6
J2	Pinch Weld Height at Rear Wheel Well	404	392	12
K	Sill Height Aft of Rear Wheel Well	428	370	58
L	Rear Bumper Thickness	70	70	0
M	Rear Bumper Bottom to Ground	424	326	98
N	Sill Height to Window Bottom Sill	782	792	-10
O	Front Door Leading Edge to Impact CL	748	737	11
P	Rear Door Trailing Edge to Impact CL	1320	1296	24
Q	Front Window Opening	603	605	-2
R	Right Side Length	4538	4543	-5
S	Left Side Length	4538	4500	38
T	Vehicle Width at B Post	1976	1866	110

DATA SHEET NO. 11 **TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014



All Measurements Shown in mm

LEFT SIDE VIEW

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground (mm)	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	427	171	1350
2	Mid Door	847	158	1500
3	Occupant Hip Point	908	155	1500
4	Window Sill	1182	97	1350
5	Window Top	1775	67	2100

Note: The measurements are taken along the vertical impact reference line.
 Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014

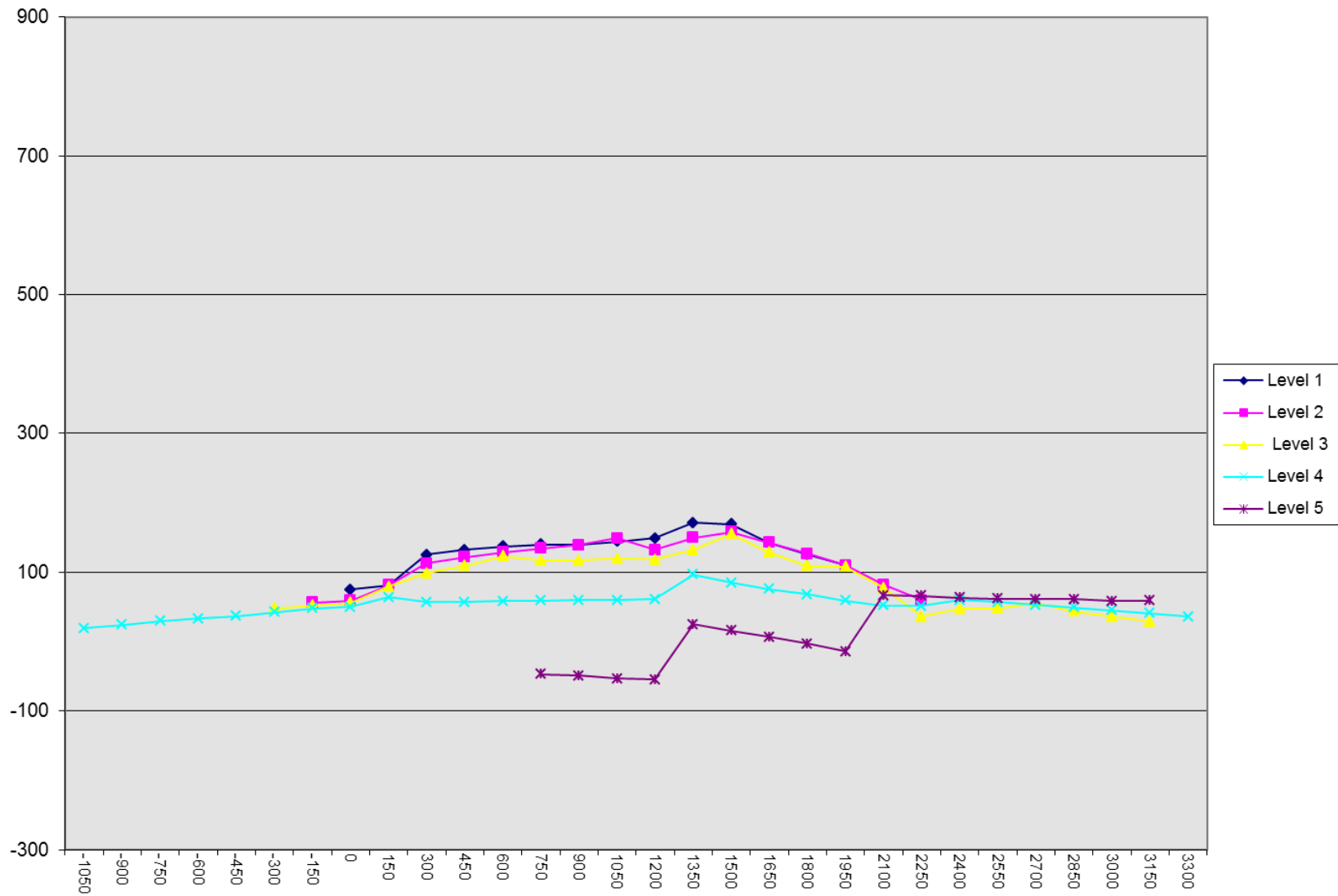
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1050				294					313					19	
-900				257					281					24	
-750				232					262					30	
-600				217					250					33	
-450				205					242					37	
-300			108	196				156	238				48	42	
-150		111	128	189			167	180	237			56	52	48	
0	153	133	135	183		228	192	191	233		75	59	56	50	
150	149	132	131	176		230	213	210	240		81	81	79	64	
300	146	127	126	170		271	240	225	227		125	113	99	57	
450	145	122	121	163		277	244	230	220		132	122	109	57	
600	146	118	118	158		283	247	241	216		137	129	123	58	
750	145	116	114	154	422	285	250	231	213	375	140	134	117	59	-47
900	145	113	112	150	415	284	252	229	210	366	139	139	117	60	-49
1050	144	111	110	147	412	288	260	230	207	359	144	149	120	60	-53
1200	144	110	109	145	408	293	242	227	206	353	149	132	118	61	-55
1350	145	111	111	142	406	316	261	243	239	431	171	150	132	97	25
1500	142	110	110	140	402	311	268	265	225	418	169	158	155	85	16
1650	143	110	109	138	399	285	253	238	214	406	142	143	129	76	7
1800	143	110	109	137	399	268	237	218	205	396	125	127	109	68	-3
1950	144	110	109	137	396	254	220	217	196	382	110	110	108	59	-14
2100		105	109	138	394		187	187	190	461		82	78	52	67
2250		87	99	138	393		147	135	189	459		60	36	51	66
2400			83	139	393			130	199	456			47	60	63
2550			84	140	394			132	197	456			48	57	62
2700			93	142	395			149	195	456			56	53	61
2850			114	145	396			158	194	457			44	49	61
3000			125	148	399			161	193	457			36	45	58
3150			132	152	401			161	193	460			29	41	59
3300				156					192					36	

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point.

DATA SHEET NO. 11 (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2015 Ford Expedition XLT SUV
Test Program: NCAP Side MDB Impact Test

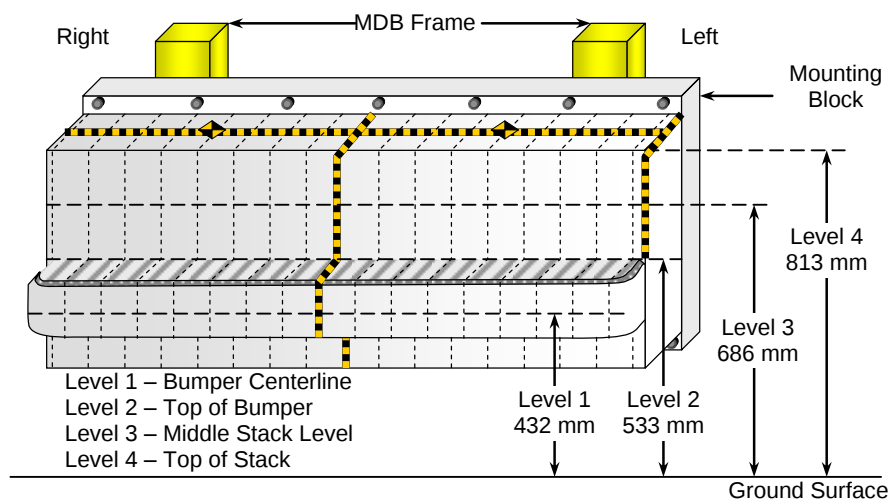
NHTSA No. M20150212
Test Date: 12/10/2014



DATA SHEET NO. 12
MDB EXTERIOR STATIC CRUSH MEASUREMENTS

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014



FRONT VIEW

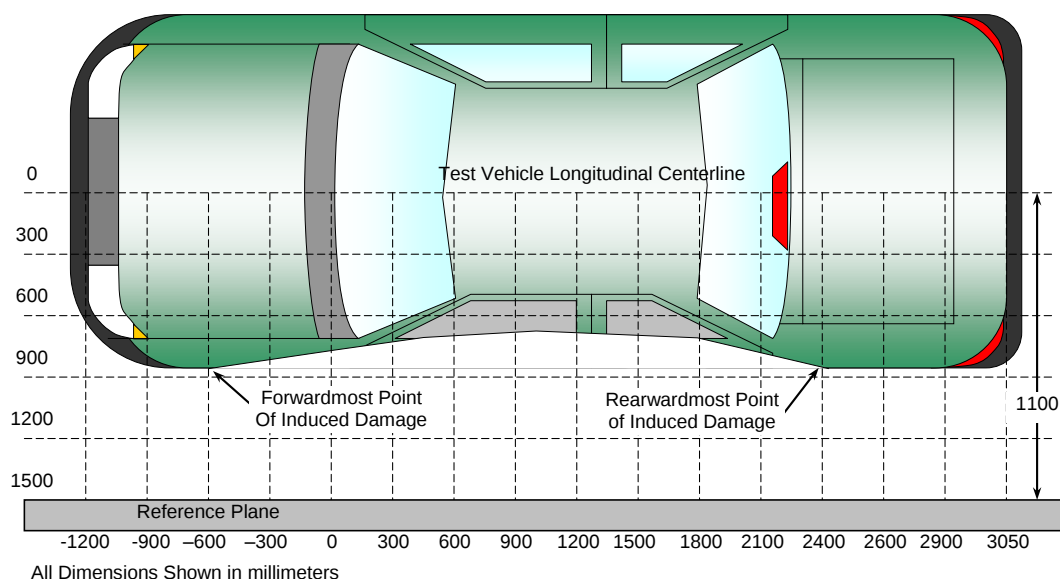
DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center (mm)								C _L	Distance Left of Center (mm)							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
4	239	201	178	159	151	149	187	198	176	138	131	140	142	128	132	149	164
3	252	204	179	162	136	127	133	163	168	163	153	141	129	122	116	111	126
2	259	214	205	183	175	181	203	206	209	210	199	194	191	184	179	174	168
1	195	196	191	189	186	183	182	186	193	195	186	176	170	166	160	156	155

DATA SHEET NO. 13
VEHICLE AND MDB DAMAGE PROFILE DISTANCES

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014



TOP VIEW

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance from Impact Point (mm)	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	2300	3	97	148	51
2	1850	3	109	216	107
3	1400	3	111	248	137
4	950	3	111	230	119
5	500	3	120	232	112
6	50	3	134	191	57

MDB DAMAGE PROFILE DISTANCES

DPD	Distance from Center of MDB	Level	Post-Test (mm)
1	800 mm right of center	1	195
2	480 mm right of center	1	189
3	160 mm right of center	1	184
4	160 mm left of center	1	191
5	480 mm left of center	1	165
6	800 mm left of center	1	155

DATA SHEET NO. 14
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

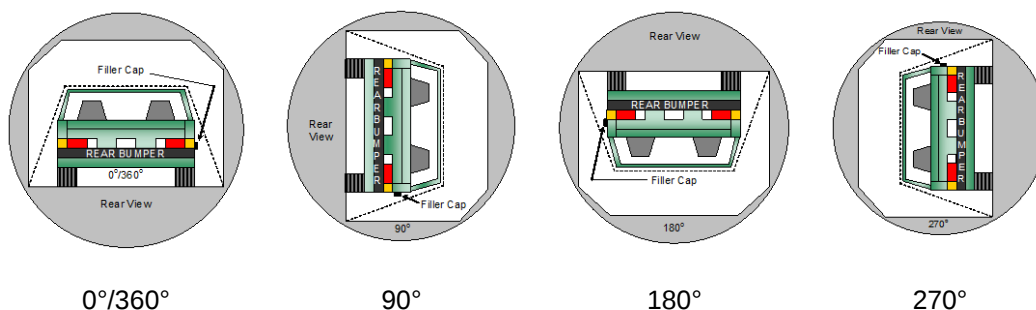
NHTSA No. M20150212
 Test Date: 12/10/2014

Test Time: 4:02 pm

Temperature: 21.9° C

- A. From impact until vehicle motion ceases: 0 oz.
 (Maximum Allowable = 1 ounce)
 B. For the 5 minute period after motion ceases: None
 (Maximum allowable = 5 ounces)
 C. For the following 25 minutes: None
 (Maximum allowable = 1 oz./minute)
 D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	171	300	471
90° to 180°	136	300	436
180° to 270°	119	300	419
270° to 360°	143	300	443

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eight Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 15 **DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA**

Test Vehicle: 2015 Ford Expedition XLT SUV
 Test Program: NCAP Side MDB Impact Test

NHTSA No. M20150212
 Test Date: 12/10/2014

