

REPORT NUMBER: 5FEM-MGA-2001-018

35 MPH FRONTAL BARRIER IMPACT TEST

**Nissan Motor Company
2001 Nissan Sentra GXE 4 Door
NHTSA NUMBER: M15208**

**PREPARED BY:
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5000 WARREN ROAD
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March 23, 2001

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
400 SEVENTH STREET, SW, ROOM 5311
WASHINGTON, D.C. 20590**

35 MPH FRONTAL BARRIER IMPACT TEST

Vehicle: 2001 Nissan Sentra GXE 4 Door

NHTSA No.: M15208

Test Date: March 23, 2001

Test Speed: 56.3 kph

Vehicle Test Weight:

Weight as Delivered: = 1187.5 kg

Weight as Tested: = 1368.9 kg

Injury Criteria:

ATD Position	HIC	Clip (g's)	Chest Disp (mm)	Left Femur (N)	Right Femur (N)
Driver	176	39	19	3034	2729
Passenger	348	47	15	2994	2449

DATA SHEET NO. 8
HYBRID III ATD INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2001/Nissan/Sentra GXE/4 Door
 Test Program: 35 mph Frontal Barrier Impact

NHTSA No.: M15208
 Test Date: March 23, 2001

HEAD PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	4.1	100	-49.1	61	20.5	196	-58.6	70
Head CG	Y	G's	6.7	26	-18.0	75	12.6	78	-5.8	60
Head CG	Z	G's	15.6	28	-7.2	77	17.1	40	-11.7	100
Head CG Resultant	N/A	G's	49.9	61			59.5	70		

CHEST PRIMARY PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	1.5	146	-40.7	62.4	5.1	185	-49.4	77
Chest CG	Y	G's	4.2	101	-7.8	62.4	9.4	67	-10.9	74
Chest CG	Z	G's	8.0	82	-9.2	62.9	13.5	83	-9.0	103
Chest CG Resultant	N/A	G's	42.4	63			50.5	77		

FEMUR PEAK FORCES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Femur	Z	Newtons	707	41	-3034	56	97	20	-2994	59
Right Femur	Z	Newtons	321	47	-2729	59	102	22	-2449	69

SEAT BELT SENSOR PEAK VALUES

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Lap Belt Force	N/A	Newtons	2842	50			1921	42		
Shoulder Belt Force	N/A	Newtons	4233	50			4548	80		

HEAD INJURY CRITERIA (HIC₁₅)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Primary	176	42.4	48.6	63.6	348	55.7	67.5	82.5

CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Primary	39.3	51.6	54.7	47.0	75.6	78.7

NECK INJURY CRITERIA

Location	Driver	Passenger
N _{te}	0.3	0.3
N _{tf}	0.5	0.1
N _{ce}	0.2	0.3
N _{cf}	0.0	0.1

DATA SHEET NO. 8...(continued)
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PELVIC PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Pelvis	X	G's	1.1	173	-60.9	54	4.4	99	-44.7	44
Pelvis	Y	G's	11.3	93	-17.8	53	6.7	51	-8.9	68
Pelvis	Z	G's	2.4	151	-27.5	57	2.9	191	-19.4	64

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	203	65	-424	45	572	75	-188	29
Neck Force	Y	Newtons	272	68	-275	118	62	176	-89	100
Neck Force	Z	Newtons	1490	52	-129	97	588	50	-329	106
Neck Moment	X	N•m	6.8	171	-24.9	123	10.5	61	-8.5	139
Neck Moment	Y	N•m	33.8	47	-17.9	148	19.3	66	-13.4	29
Neck Moment	Z	N•m	21.4	84	-12.5	150	3.1	196	-4.9	92

FOOT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Foot Aft	X	G's	9.5	62	-51.8	43	34.2	60	-341.9	43
Left Foot Aft	Z	G's	5.8	60	-85.3	44	39.2	63	-188.7	42
Left Foot Fore	Z	G's	32.5	40	-94.5	44	65.1	46	-473.1	42
Right Foot Aft	X	G's	14.0	69	-184.4	49	25.3	54	-183.6	44
Right Foot Aft	Z	G's	16.2	74	-141.3	47	8.5	51	-106.7	44
Right Foot Fore	Z	G's	52.8	49	-358.0	40	35.9	51	-112.5	40

UPPER AND LOWER TIBIA PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Left Lower Moment	X	N•m	10.2	90	-6.7	60	24.0	47	-69.6	56
Left Lower Moment	Y	N•m	6.2	88	-71.2	52	93.4	62	-41.1	48
Left Lower Force	Z	Newtons	1921	52	-168	27	1398	58	-126	106
Left Upper Moment	X	N•m	34.8	52	-23.1	87	49.1	51	-27.4	63
Left Upper Moment	Y	N•m	14.9	87	-116.8	52	8.4	69	-76.0	55
Left Upper Force	Z	Newtons	1204	52	-222	28	1266	59	-249	37
Right Lower Moment	X	N•m	42.0	54	-33.0	46	9.0	45	-7.8	59
Right Lower Moment	Y	N•m	55.1	56	-64.7	41	8.8	67	-32.2	54
Right Lower Force	Z	Newtons	4693	49	-223	92	665	41	-129	107
Right Upper Moment	X	N•m	13.7	139	-61.4	47	23.3	74	-4.6	150
Right Upper Moment	Y	N•m	19.6	88	-112.3	50	13.9	100	-55.5	47
Right Upper Force	Z	Newtons	3549	49	-308	90	489	40	-194	62

DATA SHEET NO. 8...(continued)
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CHEST PEAK DISPLACEMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	mm			19	83			15	78

HEAD REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	4.8	97	-47.4	61	20.3	196	-58.7	73
Head CG	Y	G's	6.4	26	-16.4	73	14.0	77	-5.4	39
Head CG	Z	G's	15.0	28	-7.3	61	19.6	40	-11.5	103
Head CG Resultant	N/A	G's	48.2	61			60.0	73		

CHEST REDUNDANT PEAK ACCELERATIONS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Chest CG	X	G's	1.4	124	-40.2	63	5.2	187	-48.2	77
Chest CG	Y	G's	4.8	95	-7.4	62	8.8	67	-11.0	74
Chest CG	Z	G's	8.2	82	-8.5	63	13.2	83	-9.0	103
Chest CG Resultant	N/A	G's	41.6	63			49.4	77		

REDUNDANT HEAD INJURY CRITERIA (HIC)

Location	Driver				Passenger			
	HIC	Avg G's	T ¹	T ²	HIC	Avg G's	T ¹	T ²
Head CG Redundant	165	41.4	48.5	63.5	345	55.6	67.6	82.6

REDUNDANT CHEST CLIP (3MSEC)

Location	Driver			Passenger		
	CLIP	T ¹	T ²	CLIP	T ¹	T ²
Chest CG Redundant	39.0	51.4	54.5	46.2	75.7	78.8

