HSNO 637178

REPORT NUMBER: 114-CAL-04-03

SAFETY COMPLIANCE TESTING FOR
FMVSS No. 114
THEFT PROTECTION

MAZDA MOTOR CORPORATION
2004 MAZDA 6 4-DOOR SEDAN

NHTSA NUMBER: C45400

GENERAL DYNAMICS TEST NUMBER: 8655-F114-03

GENERAL DYNAMICS
ADVANCED INFORMATION ENGINEERING SERVICES
TRANSPORTATION SCIENCES CENTER
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April 28, 2004

FINAL REPORT

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
400 Seventh Street, SW
Room No. 6115 (NVS-220)
Washington, DC 20590

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Approval Date: April 28, 2004

FINAL REPORT ACCEPTANCE BY OVSC:

Accepted By: ____________________

Acceptance Date: 5/18/04

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15. Supplementary Notes			
16. Abstract Compliance tests were conducted on the subject 2004 Mazda 6 4-door Sedan in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-114-01 for the determination of FMVSS 114 compliance. Test failures were identified as follows: None			
17. Key Words Compliance Testing Safety Engineering FMVSS 114		18. Distribution Statement Copies of this report are available from: NHTSA Technical Information Services (TIS) Room 5108 (NAD-40) 400 Seventh Street, SW Washington, D.C. 20590 Telephone No. (202) 366-2588	
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SECTION 1

PURPOSE OF COMPLIANCE TEST

This test is part of the Federal Motor Vehicle Safety Standard (FMVSS) 114 Compliance Test Program conducted for the National Highway Traffic Safety Administration (NHTSA) by General Dynamics Advanced Information Engineering Services under Contract No. DTNH22-01-C-01025. The purpose of this test was to determine if the subject vehicle, a 2004 Mazda 6 4-door Sedan, was in compliance with FMVSS No. 114, Theft Protection. The purpose of this standard is to reduce the incidence of crashes resulting from unauthorized operation of vehicles by specifying requirements for theft protection. Additionally, FMVSS No. 114 specifies requirements to reduce the incidents of crashes from rollaway of parked vehicles with automatic transmissions as a result of children moving the shift mechanism out of the "park" position. This standard applies to passenger cars, trucks and multipurpose passenger vehicles having a Gross Vehicle Weight Rating (GVWR) of 4536 kilograms or less. This compliance test was conducted using the requirements found in the OVSC Laboratory Test Procedure No. TP-114-01, dated December 17, 1997.

SECTION 2

TEST PROCEDURE AND DISCUSSION OF RESULTS

A 2004 Mazda 6 4-door Sedan with an automatic transmission was subjected to FMVSS No. 114 testing in accordance with the NHTSA Office of Vehicle Safety Compliance (OVSC) Laboratory Test Procedure TP-114-01, dated December 17, 1997. This test was performed by General Dynamics Advanced Information Engineering Services on April 12, 2004.

The test equipment used for this test included a standard metric tape ruler, a digital inclinometer with digital clinometer function, weight scales and a digital manometer. Testing was performed in the following sequence:

KEY LOCKING SYSTEM REQUIREMENT (S4.2):

The key locking system with the key removed, did prevent normal activation of the vehicle's engine. Both steering and forward self mobility were prevented.

WARNING ALARM REQUIREMENT (S4.5):

With the key left in the locking system and the driver's door opened, an audible alarm was activated. This "warning to the driver" was verified in all ignition switch positions except "on" and "start".

"PARK" POSITION REQUIREMENT (S4.2.1(a)(2)):

The key locking system only permitted removal of the key when the automatic transmission shift lever was locked in "park". Key removal was attempted in all shift lever positions. On this vehicle, the transmission shift lever would not remain between detent positions without assistance.

TEN PERCENT GRADE "PARK" REQUIREMENT (S4.2.1(a)(3))

The vehicle was driven forward and stopped with the service brakes on a 10.9% grade. The parking brake was fully applied and the transmission lever was placed in "park". When the service and parking brakes were released the vehicle moved 49 mm (150 mm maximum is allowed on a 10% grade). Since the available test grade was more stringent than the specified condition, the subject vehicle appeared to perform within the safety performance requirements.

SPECIAL DEVICES REQUIREMENT (S4.2.2):

The test vehicle was not equipped with any special devices.

"OUT OF PARK" POSITION REQUIREMENT (S4.3):

Starting from the condition of the engine running at idle with the transmission shift lever in the "drive" position, the steering wheel remained unlocked and the vehicle was free to roll with the transmission shift lever in each position except "park" or "reverse" when the key locking system was turned to the "lock" position.

SECTION 3

TEST DATA

FMVSS 114, THEFT PROTECTION

DATA SHEET 1 – ALL VEHICLES

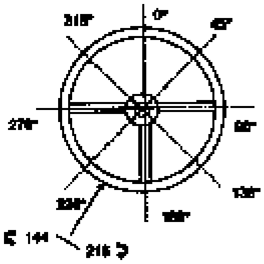
TEST DATE: April 12, 2004 LAB: General Dynamics
CONTRACT: DTNH22-01-C-01025 VEHICLE NHTSA NUMBER: C45400
VIN: 1YVFP80C345N22817 BUILD DATE: 09/03
MY/MAKE/MODEL/BODY STYLE: 2004 Mazda 6 4-door Sedan

LOCATION OF KEY LOCKING SYSTEM: The key locking system consisted of an ignition switch mounted on the right side of steering column and a transmission shift lever that was located on the center console mounted to the vehicle floor.

TRANSMISSION TYPE:
Automatic x ; Manual - ; Other (describe: n/a)

DRIVE TRAIN TYPE:
Front Wheel x ; Rear Wheel - ; Four Wheel -

OPTIONAL RELEASE DEVICES:
Key - ; Transmission - ; None x

REQUIREMENT S4.2	PASS	FAIL
Engine cannot be started without utilizing the ignition key.	x	-
With key removed, steering wheel locks: Yes x ; No - Identify locking position on wheel using an arrow. Clockwise - 216° Counterclockwise - 144° 	x	-
Key removal prevents forward self mobility: Yes x ; No If yes describe: Automatic transmission remains in "park" position.	x	-
Locking system, with key removed prevents starting the engine and either steering or self mobility or both.	x	-

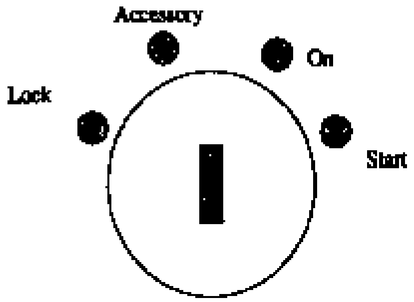
FMVSS 114, THEFT PROTECTION

DATA SHEET 1 – ALL VEHICLES (continued)

REQUIREMENT S4.5	PASS	FAIL
Warning system is activated when the ignition key is left in any switch position except "on" and "start" and the driver's door is opened.	x	-

REMARKS:

Ignition Switch Positions: (refer to page 6-3 of this report for a description of the switch positions provided in the vehicle owner's manual).



RECORDED BY: James Czarnecki DATE: April 12, 2004

APPROVED BY:

FMVSS 114, THEFT PROTECTION

DATA SHEET 2 – AUTOMATIC TRANSMISSION VEHICLES ONLY

TEST DATE: April 12, 2004 LAB: General Dynamics
CONTRACT: DTNH22-01-C-01025 VEHICLE NHTSA NUMBER: C45400
VIN: 1YVFP80C345N22817 BUILD DATE: 09/03
MY/MAKE/MODEL/BODY STYLE: 2004 Mazda 6 4-door Sedan

VEHICLE TEST WEIGHT* (kg): 1495 WEIGHT OF DRIVER AND BALLAST (kg): 91
FUEL TANK LEVEL: 100 (% OF MAX)
*with driver and ballast

TIRE PRESSURE:
Vehicle Manufacturer Recommended (kPa): Front 220 ; Rear 220
Measured (kPa): LF 220 ; LR 220 ; RF 220 ; RR 220

REQUIREMENT S4.2.1(a)(2)	PASS	FAIL
Key locking system prevents key removal from any shift mechanism detent position except "park".	x	SEE NOTE
Key locking system prevents key removal from any position between the detent positions where the shift mechanism will remain without assistance.	x	SEE NOTE
NOTE: In the event that the key can be removed at any of the transmission shift lever positions, the vehicle's transmission or transmission shift lever shall become locked in "park" as the direct result of removing the key. If such a mechanism exists, describe the mechanism and its function: <u>No such mechanism is available.</u>	N/A	
System prevents movement of the shift mechanism out of "park' position after removal of key.	x	

DATA SHEET 2 – AUTOMATIC TRANSMISSION VEHICLES ONLY (continued)

REQUIREMENTS S4.2.1(a)(3)	PASS	FAIL
With the transmission in "park" measure movement of the vehicle down the slope upon releasing the service brake. Test grade: 10.9 % (9 to 15 %) Measured movement: 49 mm (150 mm maximum)	x	SEE NOTE
NOTE: Repeat procedure if vehicle fails on a grade in excess of 10%. Test grade: - % (9 to 10 %) Measured movement: - mm (150 mm maximum)	N/A	-

REQUIREMENT S4.3	PASS	FAIL
Transmission in any position other than "park" or "reverse" and the key locking system in the "lock" position. The steering wheel must remain unlocked and the vehicle must remain free to roll.	x	

REMARKS:

RECORDED BY: James Czarnecki DATE: April 12, 2004

APPROVED BY:

FMVSS 114, THEFT PROTECTION

DATA SHEET 3 – SPECIAL DEVICES

TEST DATE: April 12, 2004 **LAB:** General Dynamics
CONTRACT: DTNH22-01-C-01025 **VEHICLE NHTSA NUMBER:** C45400
VIN: 1YVFP80C345N22817 **BUILD DATE:** 09/03
MY/MAKE/MODEL/BODY STYLE: 2004 Mazda 6 4-door Sedan

REQUIREMENTS S4.2.2(a)	PASS	FAIL
Electrical failure capability permits ignition key removal with transmission shift lever in other than "park" position. Yes - No -		
Upon key removal steering wheel locks.	N/A	N/A
Device permits key removal when the transmission is in other than the "park" position. Yes - No -		
The means for activating this device is covered by a non-transparent surface which prevents sight and activation of the device. The non-transparent surface is removable only by use of a screwdriver or other tool.	N/A	N/A
Describe the device, its cover and its location: Not applicable		
Describe how the device is activated: Not applicable		
Upon key removal, steering wheel locks.	N/A	N/A

REMARKS:

Test vehicle is not equipped with this special device.

FMVSS 114, THEFT PROTECTION

DATA SHEET 3 – SPECIAL DEVICES (continued)

REQUIREMENTS S4.2.2(b)	**PASS**	**FAIL**
Device permits moving the transmission shift lever from "park" after key removal. Yes _-_ No _-_	N/A	N/A
The means for activating this device is covered by a non-transparent surface which prevents sight and activation of the device. The non-transparent surface is removable only by use of a screwdriver or other tool.		
Describe the device, its cover and its location: <u>Not applicable</u>		
Describe how the device is activated: <u>Not applicable</u>		
Upon device activation, the steering wheel remains locked.	N/A	N/A

REMARKS:

<u>Test vehicle is not equipped with this special device.</u>

RECORDED BY: James Czarnecki DATE: April 12, 2004

APPROVED BY:

SECTION 4

TEST EQUIPMENT LIST AND CALIBRATION DATES

Equipment	Manufacturer	Name	Range	Accuracy	Calibration Date	Calibration Due
Clinometer	MD	Smart Level	0-100%	0.1%	3/29/2004	3/29/2005
Steel Tape	Stanley	Stanley 3137	3 meters	0.5mm	N/A	N/A
Weight Scales	Long Acre	Computer Scales 2000	0-12,000lbs.	0.2%	11/25/2003	11/25/2004
Manometer	Meriam Instrument Co.	350 Smart Manometer	0-200 psi.	0.05%	8/3/2003	8/3/2004
Plumb Bob	Stanley	Plumb bob	N/A	N/A	N/A	N/A

SECTION 5

PHOTOGRAPHS

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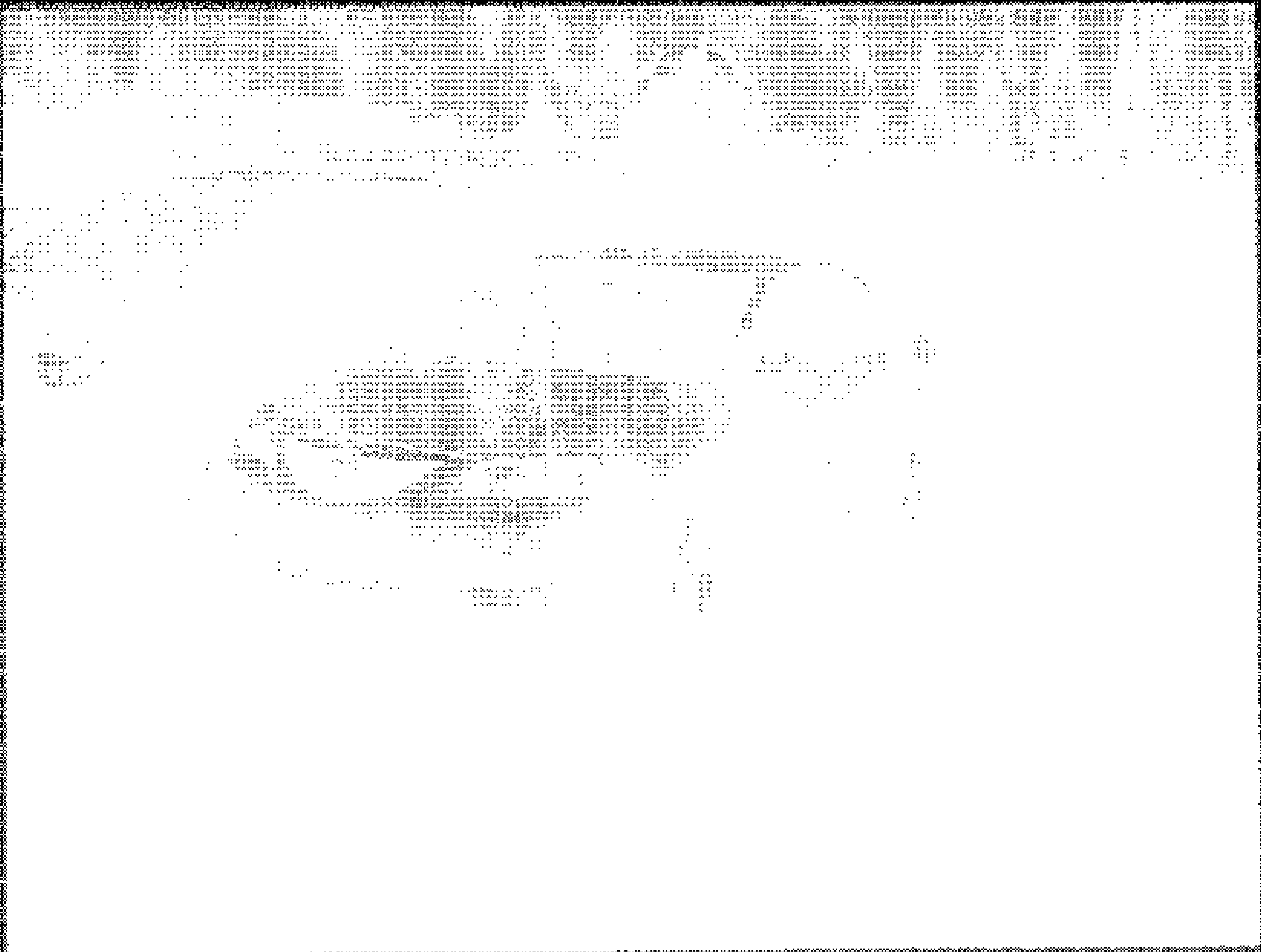


Figure 1. Vehicle Left Front Three-Quarter View

2004 Mazda 6 4-door Sedan
NHTSA No. C45409

Figure 2: Vehicle Identification Placard

2004 Mazda 6 4-door Sedan
NHTSA No. C40400

Figure 3. Vehicle Test Placard

2014 Mazda 6 4-door Sedan
NHTSA No. DC5400

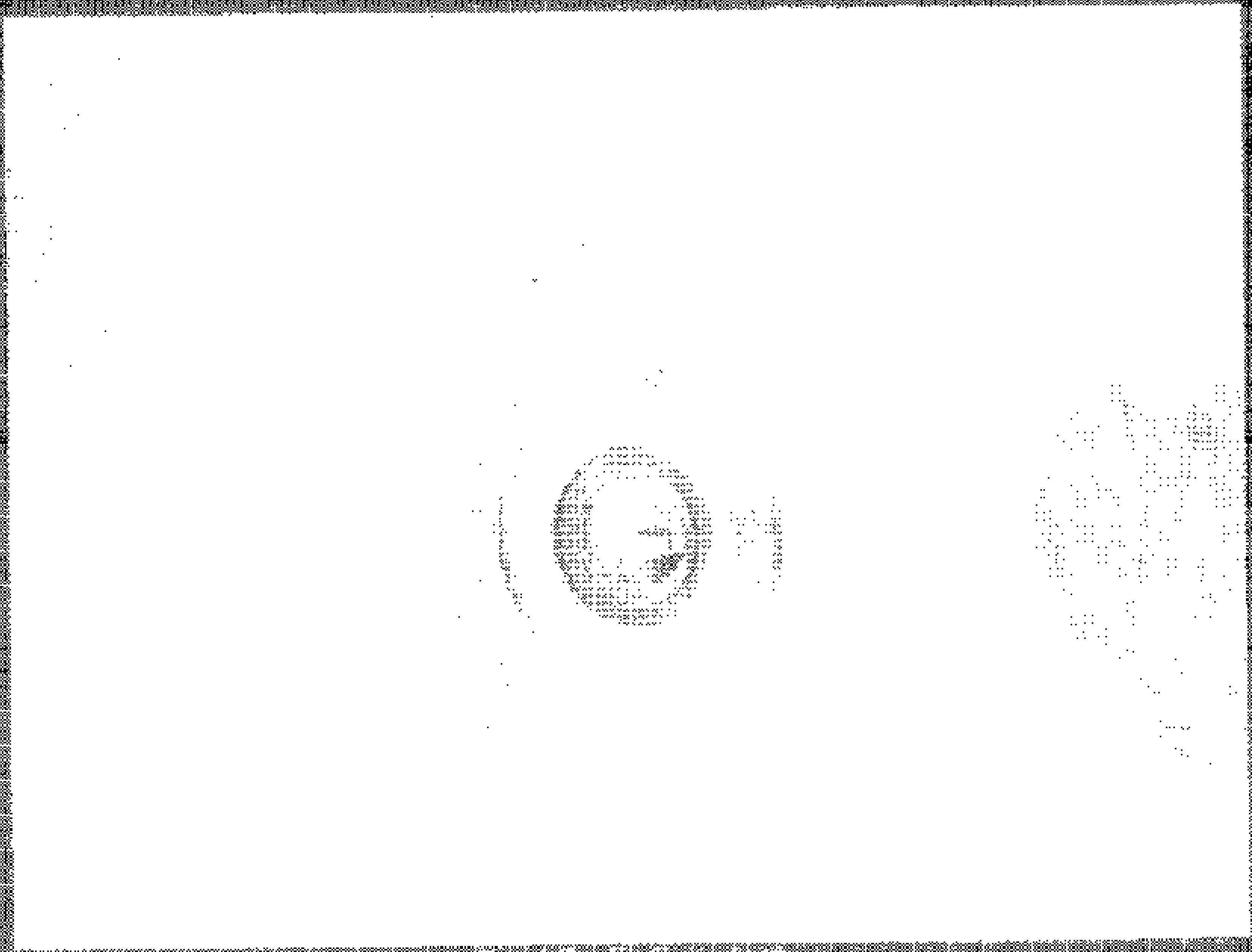


Figure 4 Close-Up of Ignition Switch

2004 Mazda 6 4-door Sedan
NHTSA No. C45400

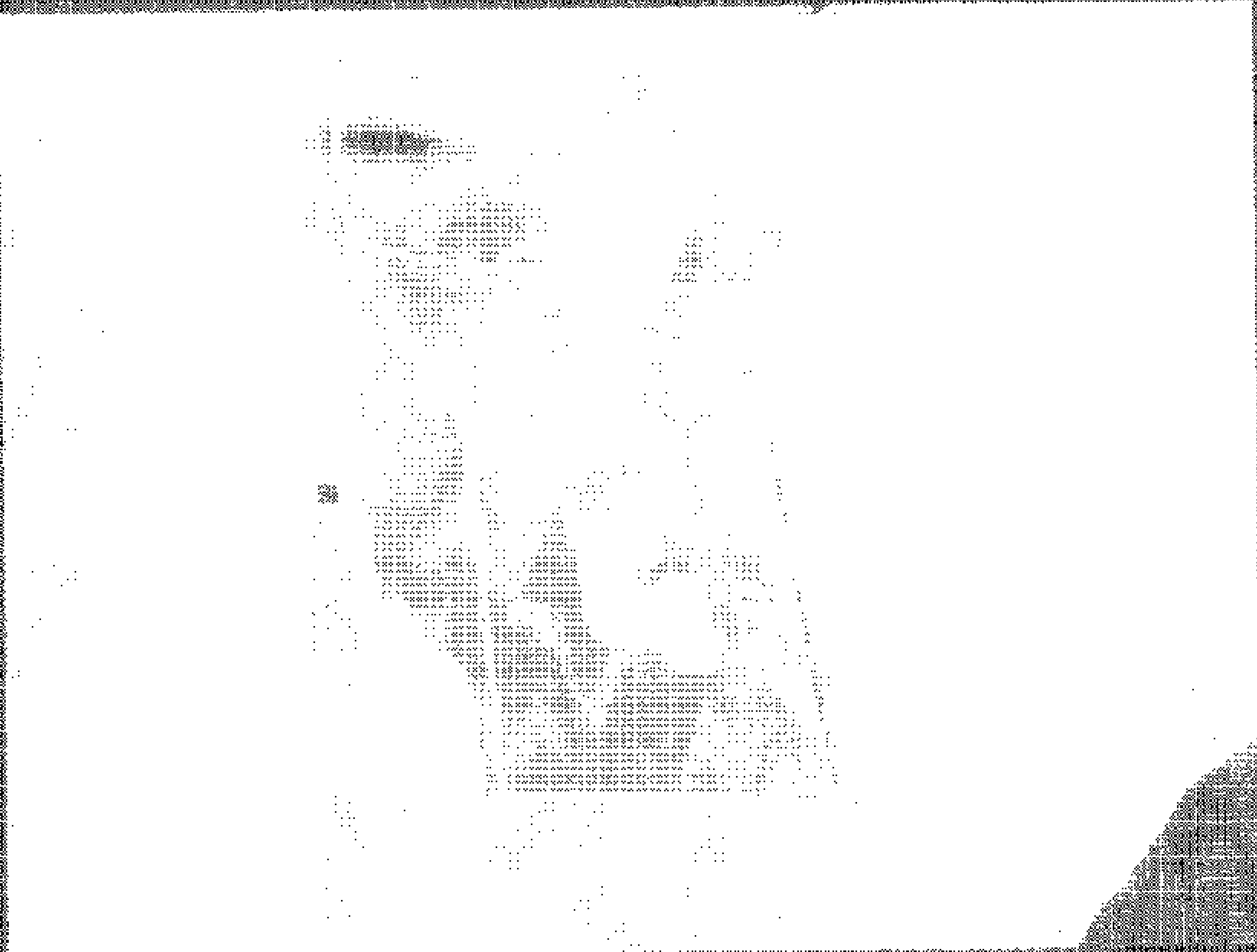
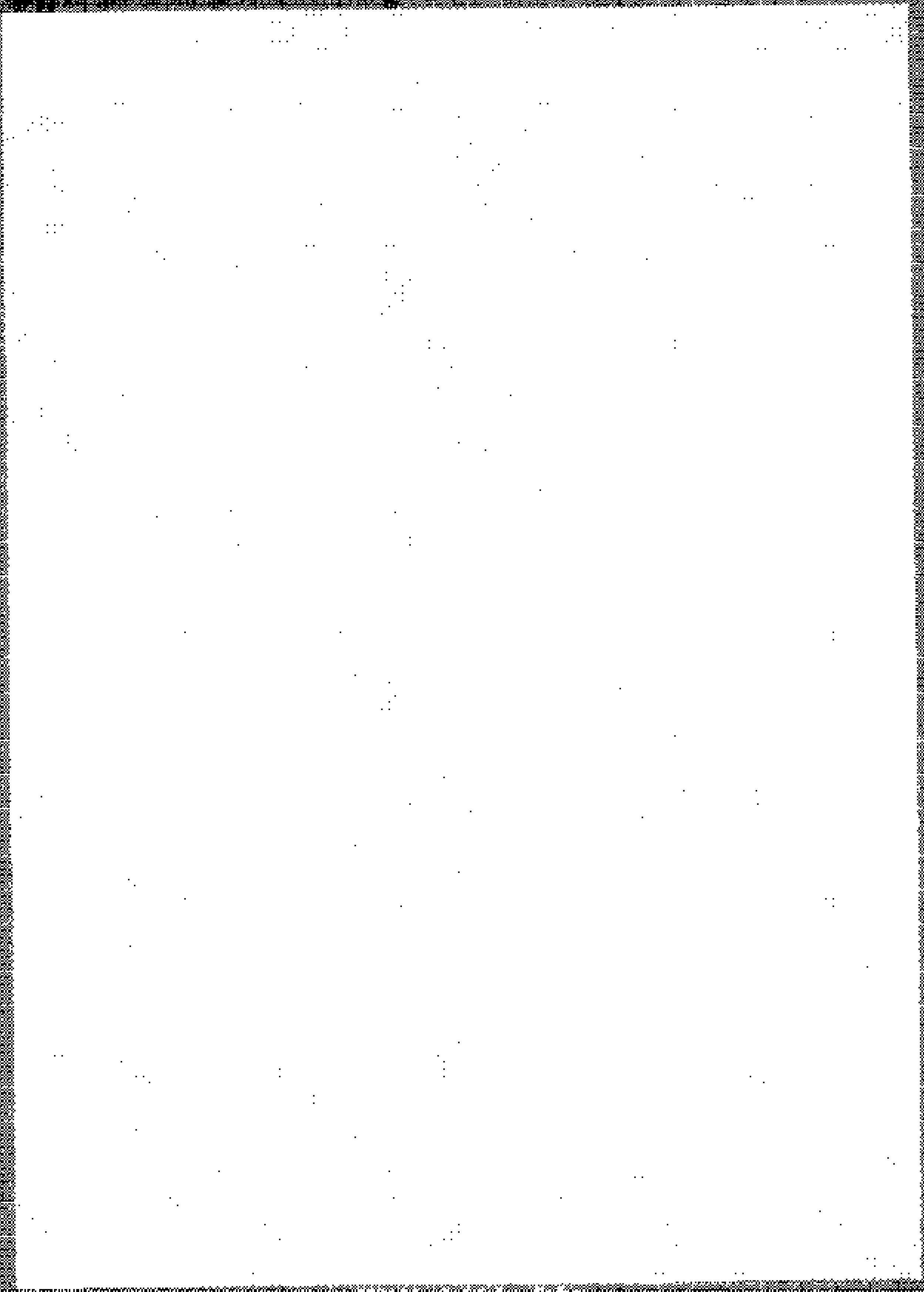


Figure 5. Close-Up of Transmission Shift Lever Mechanism

2004 Mazda 6 4-door Sedan
NHTSA No. C45400

SECTION 6

VEHICLE OWNER'S MANUAL



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