2012 - Mazda6 - Engine

NO.15 EMISSION COMPLIANCE [MZR 2.5]

15	EMISSION COMPLIANCE
DESCRIPTION	• Fails emissions test.

POSSIBLE CAUSE	• Electrical connector disconnection
	• Intake air system and air cleaner element malfunction
	• Vacuum lines leakage or blockage
	• PCM DTC is stored.
	• Cooling system malfunction
	• Fuel-filler cap malfunction
	• A/F sensor malfunction
	• Ignition system improper operation
	  ▪ Spark plug malfunction
	  ▪ Ignition coil malfunction
	  ▪ Ignition coil related wiring harness malfunction
	• Erratic or no signal from CMP sensor
	• Excessive or insufficient fuel pressure
	  ▪ Fuel pump relay or fuel pump circuit malfunction
	  ▪ Restriction in fuel line
	  ▪ Pressure regulator malfunction (built-into fuel pump unit)
	  ▪ Fuel pump malfunction
	• Charcoal canister malfunction
	• Exhaust system clogging
	• TWC malfunction
	• EGR system malfunction
	• Base engine malfunction
	• Improper engine compression
	• Improper valve timing
	• PCV valve malfunction
	WARNING:
	The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:
	• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.
	• Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and

damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual. (See **BEFORE SERVICE PRECAUTION [MZR 2.5]**.) (See **AFTER SERVICE PRECAUTION [MZR 2.5]**.)

CAUTION:

- **Disconnecting/ connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and the quick release connector. Always clean the quick release connector joint area before disconnecting/ connecting, and make sure that it is free of foreign material.**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	**INSPECT RELATED PART CONDITION** • Inspect the following: ▪ Vacuum lines for leakage or blockage ▪ Electrical connections ▪ Proper maintenance schedule followed ▪ Intake air system and air cleaner element concerns: obstructions, leakage or soiling • Are all items normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
2	**VERIFY PCM DTC** • Retrieve any DTCs using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZR 2.5]**.) • Are there any DTCs displayed?	Yes	Go to the appropriate DTC inspection. (See **DTC TABLE [MZR 2.5]**.)
		No	Go to the next step.
3	**VERIFY IF MALFUNCTION INCLUDES DRIVEABILITY** • Is any other drivability concern present?	Yes	Go to the appropriate symptom troubleshooting.
		No	Go to the next step.
4	**INSPECT COOLING SYSTEM FOR MALFUNCTION** • Access the PCM PID ECT using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZR 2.5]**.) • Warm up the engine and idle it. • Is the ECT PID normal?	Yes	Go to the next step.
		No	Inspect the following: • Coolant leakage • Cooling fan and condenser fan operation • Thermostat operation Repair or replace the malfunctioning part according to the inspection results.

	(See **PCM INSPECTION [MZR 2.5]**.)		
5	**INSPECT FUEL CAP** • Inspect the fuel-filler cap. (See **FUEL-FILLER CAP INSPECTION [MZR 2.5]**.) • Is there any leakage at the fuel-filler cap?	Yes	Replace the fuel-filler cap.
		No	Go to the next step.
6	**INSPECT CURRENT A/F SENSOR SIGNAL** • Inspect the A/F sensor. (See **AIR FUEL RATIO (A/F) SENSOR INSPECTION [MZR 2.5]**.) • Is the A/F sensor normal?	Yes	Go to the next step.
		No	Inspect for following: • Exhaust gas leakage between exhaust manifold and A/F sensor • Loose installation of A/F sensor Repair or replace the malfunctioning part according to the inspection results. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [MZR 2.5]**.) • If there are no malfunctions detected, replace the A/F sensor. (See **AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [MZR 2.5]**.)
7	**INSPECT IGNITION SYSTEM OPERATION** • Perform the Spark Test. (See **ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZR 2.5]**.) • Is a strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
8	**INSPECT FUEL LINE PRESSURE** • Inspect the fuel line pressure. (See **FUEL LINE PRESSURE INSPECTION [MZR 2.5]**.) • Is the fuel line pressure correct?	Yes	Go to the next step.
		No	Zero or low: • Inspect the following: ▪ Fuel pump relay ▪ Fuel pump circuit ▪ Fuel line for clogging • If there is no malfunction, replace the fuel pump unit. (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [MZR 2.5]**.) High: • Replace the fuel pump unit. (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [MZR 2.5]**.)
9	**DETERMINE IF MALFUNCTION CAUSE IS CHARCOAL CANISTER OR FUEL TANK VENT SYSTEM**	Yes	Replace the charcoal canister.

	• Inspect for fuel saturation inside the charcoal canister. • Is there an excess amount of liquid fuel present in canister?		(See **CHARCOAL CANISTER, CANISTER VENT (CV) SOLENOID VALVE, AIR FILTER COMPONENT REMOVAL/ INSTALLATION [MZR 2.5]**.)
		No	Inspect the fuel tank vent system. (See **FUEL TANK INSPECTION [MZR 2.5]**.) Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
10	**INSPECT DEFORMED IN EXHAUST SYSTEM** • Visually inspect the exhaust system part. • Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
11	**INSPECT TWC** • Inspect the TWC. (See **EXHAUST SYSTEM INSPECTION [MZR 2.5]**.) • Is the TWC normal?	Yes	Go to the next step.
		No	Replace the TWC. (See **EXHAUST SYSTEM REMOVAL/ INSTALLATION [MZR 2.5]**.)
12	**INSPECT EGR VALVE OPERATION** • Perform the EGR control system inspection. (See **ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZR 2.5]**.) • Is the EGR system normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
13	**INSPECT ENGINE COMPRESSION** • Is the engine compression correct? (See **COMPRESSION INSPECTION [MZR 2.5]**.)	Yes	Go to the next step.
		No	Inspect for cause. Repair or replace the malfunctioning part according to the inspection results.
14	**INSPECT IF MALFUNCTION CAUSE IS PCV VALVE OR VALVE TIMING** • Inspect the PCV valve. (See **POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [MZR 2.5]**.) • Is the PCV valve normal?	Yes	Inspect the valve timing. Repair or replace the malfunctioning part according to the inspection results.
		No	Replace the PCV valve and the oil separator as a single unit, then go to the next step. (See **POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/ INSTALLATION [MZR 2.5]**.)
15	• Verify test results. ▪ If normal, return to diagnostic index to service any additional symptoms. (See **SYMPTOM DIAGNOSTIC INDEX [MZR 2.5]**.) ▪ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.		

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	WARNING:
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damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION" described in this manual. (See **BEFORE SERVICE PRECAUTION [MZR 2.5]**.) (See **AFTER SERVICE PRECAUTION [MZR 2.5]**.)

CAUTION:

- **Disconnecting/ connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and the quick release connector. Always clean the quick release connector joint area before disconnecting/ connecting, and make sure that it is free of foreign material.**

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	**INSPECT RELATED PART CONDITION** • Inspect the following: ▪ Vacuum lines for leakage or blockage ▪ Electrical connections ▪ Proper maintenance schedule followed ▪ Intake air system and air cleaner element concerns: obstructions, leakage or soiling • Are all items normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
2	**VERIFY PCM DTC** • Retrieve any DTCs using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZR 2.5]**.) • Are there any DTCs displayed?	Yes	Go to the appropriate DTC inspection. (See **DTC TABLE [MZR 2.5]**.)
		No	Go to the next step.
3	**VERIFY IF MALFUNCTION INCLUDES DRIVEABILITY** • Is any other drivability concern present?	Yes	Go to the appropriate symptom troubleshooting.
		No	Go to the next step.
4	**INSPECT COOLING SYSTEM FOR MALFUNCTION** • Access the PCM PID ECT using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZR 2.5]**.) • Warm up the engine and idle it. • Is the ECT PID normal?	Yes	Go to the next step.
		No	Inspect the following: • Coolant leakage • Cooling fan and condenser fan operation • Thermostat operation Repair or replace the malfunctioning part according to the inspection results.

	(See **PCM INSPECTION [MZR 2.5]**.)		
5	**INSPECT FUEL CAP** • Inspect the fuel-filler cap. (See **FUEL-FILLER CAP INSPECTION [MZR 2.5]**.) • Is there any leakage at the fuel-filler cap?	Yes	Replace the fuel-filler cap.
		No	Go to the next step.
6	**INSPECT CURRENT A/F SENSOR SIGNAL** • Inspect the A/F sensor. (See **AIR FUEL RATIO (A/F) SENSOR INSPECTION [MZR 2.5]**.) • Is the A/F sensor normal?	Yes	Go to the next step.
		No	Inspect for following: • Exhaust gas leakage between exhaust manifold and A/F sensor • Loose installation of A/F sensor Repair or replace the malfunctioning part according to the inspection results. (See **EXHAUST SYSTEM REMOVAL/INSTALLATION [MZR 2.5]**.) • If there are no malfunctions detected, replace the A/F sensor. (See **AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [MZR 2.5]**.)
7	**INSPECT IGNITION SYSTEM OPERATION** • Perform the Spark Test. (See **ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZR 2.5]**.) • Is a strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
8	**INSPECT FUEL LINE PRESSURE** • Inspect the fuel line pressure. (See **FUEL LINE PRESSURE INSPECTION [MZR 2.5]**.) • Is the fuel line pressure correct?	Yes	Go to the next step.
		No	Zero or low: • Inspect the following: ▪ Fuel pump relay ▪ Fuel pump circuit ▪ Fuel line for clogging • If there is no malfunction, replace the fuel pump unit. (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [MZR 2.5]**.) High: • Replace the fuel pump unit. (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [MZR 2.5]**.)
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	• Inspect for fuel saturation inside the charcoal canister. • Is there an excess amount of liquid fuel present in canister?		(See **CHARCOAL CANISTER, CANISTER VENT (CV) SOLENOID VALVE, AIR FILTER COMPONENT REMOVAL/ INSTALLATION [MZR 2.5]**.)
		No	Inspect the fuel tank vent system. (See **FUEL TANK INSPECTION [MZR 2.5]**.) Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
10	**INSPECT DEFORMED IN EXHAUST SYSTEM** • Visually inspect the exhaust system part. • Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
11	**INSPECT TWC** • Inspect the TWC. (See **EXHAUST SYSTEM INSPECTION [MZR 2.5]**.) • Is the TWC normal?	Yes	Go to the next step.
		No	Replace the TWC. (See **EXHAUST SYSTEM REMOVAL/ INSTALLATION [MZR 2.5]**.)
12	**INSPECT EGR VALVE OPERATION** • Perform the EGR control system inspection. (See **ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZR 2.5]**.) • Is the EGR system normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
13	**INSPECT ENGINE COMPRESSION** • Is the engine compression correct? (See **COMPRESSION INSPECTION [MZR 2.5]**.)	Yes	Go to the next step.
		No	Inspect for cause. Repair or replace the malfunctioning part according to the inspection results.
14	**INSPECT IF MALFUNCTION CAUSE IS PCV VALVE OR VALVE TIMING** • Inspect the PCV valve. (See **POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [MZR 2.5]**.) • Is the PCV valve normal?	Yes	Inspect the valve timing. Repair or replace the malfunctioning part according to the inspection results.
		No	Replace the PCV valve and the oil separator as a single unit, then go to the next step. (See **POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/ INSTALLATION [MZR 2.5]**.)
15	• Verify test results. ▪ If normal, return to diagnostic index to service any additional symptoms. (See **SYMPTOM DIAGNOSTIC INDEX [MZR 2.5]**.) ▪ If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. • If vehicle is repaired, troubleshooting completed. • If vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.		