2012 - Mazda6 - Engine

NO.15 EMISSION COMPLIANCE [MZI 3.7 V6]

15	EMISSION COMPLIANCE
DESCRIPTION	• Fails emissions test.

POSSIBLE CAUSE	• Vacuum lines leakage or blockage
	• Disconnected electrical system connector
	• Maintenance schedule is not followed.
	• Leakage from intake manifold
	• Air cleaner element clogging or restriction
	• Throttle body restrict or clogged
	• PCM DTC is stored.
	• Cooling system malfunction
	• Fuel-filler cap malfunction
	• Ignition system malfunction
	  ▪ Ignition coil malfunction
	  ▪ Ignition coil related circuit malfunction
	  ▪ Spark plug malfunction
	• Inadequate fuel pressure
	  ▪ Fuel pump mechanical malfunction
	  ▪ Fuel line restriction or clogging
	  ▪ Pressure regulator malfunction (built-in fuel pump unit)
	• Improper air/fuel mixture ratio control operation
	• Bend or open circuit A/F sensor wiring harness
	• Exhaust system clogging
	• PCV valve malfunction or incorrect valve installation
	• Improper engine compression
	• Fuel tank ventilation system malfunction
	• Charcoal canister damage
	• Catalyst converter malfunction
	• Engine internal parts malfunction
	  ▪ Excessive carbon is built up in combustion chamber.
	  ▪ Improper valve timing
	WARNING:
	• The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before servicing the fuel system:

- 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 [MZI 3.7 V6]**.) (See **AFTER SERVICE PRECAUTION [MZI 3.7 V6]**.)

CAUTION:

- Disconnecting/connecting quick release connector without cleaning it may cause damage to fuel pipe and quick release connector. Always clean 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 for 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 dirtiness • 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** • Switch the ignition to ON (Engine off). • Retrieve any DTCs using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6]**.) • Are there any DTCs displayed?	Yes	DTC is displayed: • Go to the appropriate DTC inspection. (See **DTC TABLE [MZI 3.7 V6]**.)
		No	No DTC is displayed: • Go to the next step.
3	**VERIFY IF MALFUNCTION INCLUDES DRIVEABILITY** • Is any other driveability concern present?	Yes	Go to the appropriate symptom troubleshooting.
		No	Go to the next step.
4	**INSPECT COOLING SYSTEM FOR MALFUNCTION** **CAUTION:** • While performing this step,	Yes	Go to the next step.
		No	Inspect for following:

	always operate the vehicle in a safe and lawful manner. • Access the PCM PID ECT using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6]**.) • Warm up the engine and idle it. • Is the PID within specification?		Coolant leakage • Cooling fans operation • Thermostat operation Repair or replace the malfunctioning part according to the inspection results.
5	**INSPECT FUEL CAP** • Inspect the fuel-filler cap. (See **FUEL-FILLER CAP INSPECTION [MZI 3.7 V6]**.) • Is there any leakage at fuel-filler cap?	Yes	Replace the fuel-filler cap.
		No	Go to the next step.
6	**INSPECT IGNITION SYSTEM OPERATION** • Perform the spark test. (See **ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6]**.) • Is 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.
7	**INSPECT FUEL LINE PRESSURE** • Install the fuel pressure gauge between the fuel pipe and fuel distributor. • Start the engine and idle it. • Measure the fuel line pressure during idle. (See **FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6]**.) • Is the fuel line pressure correct during idle?	Yes	Go to the next step.
		No	Zero or low: • Inspect for the following: ▪ Fuel pump relay ▪ Fuel pump circuit ▪ Fuel line for clogging • If there is no malfunction, replace the fuel pump unit. (Fuel pump or pressure regulator malfunction) (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [MZI 3.7 V6]**.) High: • Replace the fuel pump unit. (Pressure regulator malfunction) (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [MZI 3.7 V6]**.)
8	**INSPECT CURRENT A/F SENSOR SIGNAL** • Inspect the A/F sensor. (See **AIR FUEL RATIO (A/F) SENSOR INSPECTION [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Inspect the following: • A/F sensor installation • Exhaust gas leakage Repair or replace the malfunctioning part according to the inspection results.

			• If there is no malfunction, replace the A/F sensor. (See **AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [MZI 3.7 V6]**.)
		No	Go to the next step.
9	**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.
10	**INSPECT PCV VALVE** **NOTE:** • The PCV valve cannot be reassembled once it is removed because the tabs will have been broken. Inspect the PCV valve without removing it from the vehicle. • Inspect the PCV valve with it installed. (See **POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Replace the PCV valve. (See **POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/INSTALLATION [MZI 3.7 V6]**.)
		No	Go to the next step.
11	**INSPECT ENGINE COMPRESSION** • Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause. Repair or replace the malfunctioning part according to the inspection results.
12	**DETERMINE IF MALFUNCTION CAUSE IS CHARCOAL CANISTER OR FUEL TANK VENT SYSTEM** • Inspect for fuel saturation inside charcoal canister. • Is excess amount of liquid fuel present in canister?	Yes	Replace the charcoal canister. (See **CHARCOAL CANISTER, CANISTER VENT (CV) SOLENOID VALVE, AIR FILTER COMPONENT REMOVAL/INSTALLATION [MZI 3.7 V6]**.)
		No	Inspect the fuel tank vent system. (See **FUEL TANK INSPECTION [MZI 3.7 V6]**.) Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
13	**INSPECT IF MALFUNCTION CAUSE IS THREE-WAY CATALYTIC CONVERTER OR VALVE TIMING** • Inspect the three-way catalytic converter. (See **EXHAUST SYSTEM INSPECTION [MZI 3.7 V6]**.) • Is the three-way catalytic converter normal?	Yes	Inspect the valve timing. • If the valve timing is not normal: ▪ Repair or replace the malfunctioning part according to the inspection results. • If the valve timing is normal: ▪ Inspect the following engine internal part, such as excessive carbon is built-up in combustion chamber. ▪ Repair or replace the malfunctioning part according to the inspection results.

		No	Replace the three-way catalytic converter.
14	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See **SYMPTOM DIAGNOSTIC INDEX [MZI 3.7 V6]**.) • 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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	• Maintenance schedule is not followed.
	• Leakage from intake manifold
	• Air cleaner element clogging or restriction
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	• PCM DTC is stored.
	• Cooling system malfunction
	• Fuel-filler cap malfunction
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	  ▪ Ignition coil related circuit malfunction
	  ▪ Spark plug malfunction
	• Inadequate fuel pressure
	  ▪ Fuel pump mechanical malfunction
	  ▪ Fuel line restriction or clogging
	  ▪ Pressure regulator malfunction (built-in fuel pump unit)
	• Improper air/fuel mixture ratio control operation
	• Bend or open circuit A/F sensor wiring harness
	• Exhaust system clogging
	• PCV valve malfunction or incorrect valve installation
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CAUTION:

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Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	**INSPECT RELATED PART CONDITION** • Inspect for 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 dirtiness • 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** • Switch the ignition to ON (Engine off). • Retrieve any DTCs using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6]**.) • Are there any DTCs displayed?	Yes	DTC is displayed: • Go to the appropriate DTC inspection. (See **DTC TABLE [MZI 3.7 V6]**.)
		No	No DTC is displayed: • Go to the next step.
3	**VERIFY IF MALFUNCTION INCLUDES DRIVEABILITY** • Is any other driveability concern present?	Yes	Go to the appropriate symptom troubleshooting.
		No	Go to the next step.
4	**INSPECT COOLING SYSTEM FOR MALFUNCTION** **CAUTION:** • While performing this step,	Yes	Go to the next step.
		No	Inspect for following:

	always operate the vehicle in a safe and lawful manner. • Access the PCM PID ECT using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6]**.) • Warm up the engine and idle it. • Is the PID within specification?		Coolant leakage • Cooling fans operation • Thermostat operation Repair or replace the malfunctioning part according to the inspection results.
5	**INSPECT FUEL CAP** • Inspect the fuel-filler cap. (See **FUEL-FILLER CAP INSPECTION [MZI 3.7 V6]**.) • Is there any leakage at fuel-filler cap?	Yes	Replace the fuel-filler cap.
		No	Go to the next step.
6	**INSPECT IGNITION SYSTEM OPERATION** • Perform the spark test. (See **ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6]**.) • Is 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.
7	**INSPECT FUEL LINE PRESSURE** • Install the fuel pressure gauge between the fuel pipe and fuel distributor. • Start the engine and idle it. • Measure the fuel line pressure during idle. (See **FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6]**.) • Is the fuel line pressure correct during idle?	Yes	Go to the next step.
		No	Zero or low: • Inspect for the following: ▪ Fuel pump relay ▪ Fuel pump circuit ▪ Fuel line for clogging • If there is no malfunction, replace the fuel pump unit. (Fuel pump or pressure regulator malfunction) (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [MZI 3.7 V6]**.) High: • Replace the fuel pump unit. (Pressure regulator malfunction) (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [MZI 3.7 V6]**.)
8	**INSPECT CURRENT A/F SENSOR SIGNAL** • Inspect the A/F sensor. (See **AIR FUEL RATIO (A/F) SENSOR INSPECTION [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Inspect the following: • A/F sensor installation • Exhaust gas leakage Repair or replace the malfunctioning part according to the inspection results.

			• If there is no malfunction, replace the A/F sensor. (See **AIR FUEL RATIO (A/F) SENSOR REMOVAL/INSTALLATION [MZI 3.7 V6]**.)
		No	Go to the next step.
9	**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.
10	**INSPECT PCV VALVE** **NOTE:** • The PCV valve cannot be reassembled once it is removed because the tabs will have been broken. Inspect the PCV valve without removing it from the vehicle. • Inspect the PCV valve with it installed. (See **POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Replace the PCV valve. (See **POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/INSTALLATION [MZI 3.7 V6]**.)
		No	Go to the next step.
11	**INSPECT ENGINE COMPRESSION** • Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause. Repair or replace the malfunctioning part according to the inspection results.
12	**DETERMINE IF MALFUNCTION CAUSE IS CHARCOAL CANISTER OR FUEL TANK VENT SYSTEM** • Inspect for fuel saturation inside charcoal canister. • Is excess amount of liquid fuel present in canister?	Yes	Replace the charcoal canister. (See **CHARCOAL CANISTER, CANISTER VENT (CV) SOLENOID VALVE, AIR FILTER COMPONENT REMOVAL/INSTALLATION [MZI 3.7 V6]**.)
		No	Inspect the fuel tank vent system. (See **FUEL TANK INSPECTION [MZI 3.7 V6]**.) Repair or replace the malfunctioning part according to the inspection results, then go to the next step.
13	**INSPECT IF MALFUNCTION CAUSE IS THREE-WAY CATALYTIC CONVERTER OR VALVE TIMING** • Inspect the three-way catalytic converter. (See **EXHAUST SYSTEM INSPECTION [MZI 3.7 V6]**.) • Is the three-way catalytic converter normal?	Yes	Inspect the valve timing. • If the valve timing is not normal: ▪ Repair or replace the malfunctioning part according to the inspection results. • If the valve timing is normal: ▪ Inspect the following engine internal part, such as excessive carbon is built-up in combustion chamber. ▪ Repair or replace the malfunctioning part according to the inspection results.

		No	Replace the three-way catalytic converter.
14	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See **SYMPTOM DIAGNOSTIC INDEX [MZI 3.7 V6]**.) • 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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