

# EXHAUST SYSTEM

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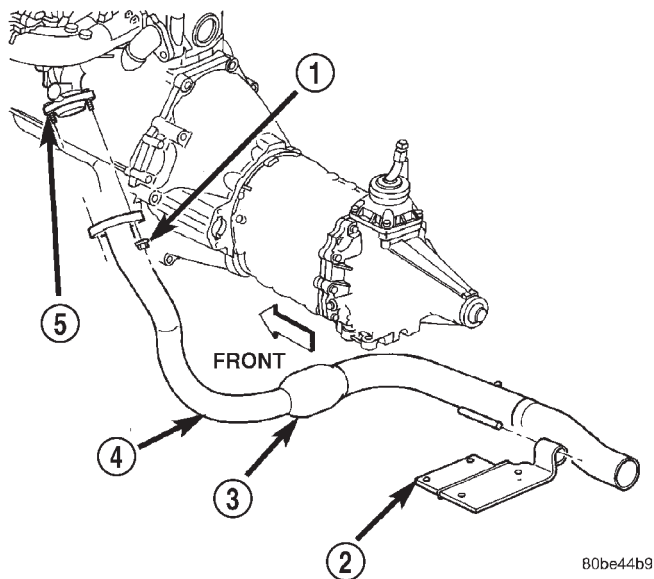
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## DESCRIPTION AND OPERATION

### EXHAUST SYSTEM

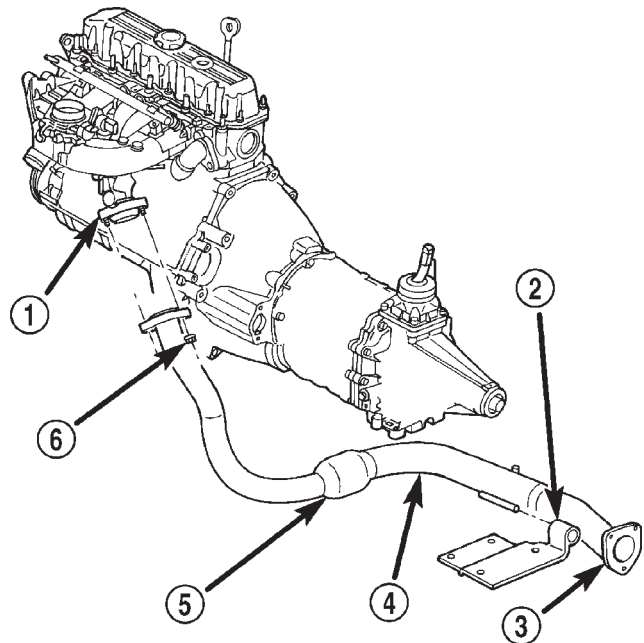
#### DESCRIPTION

The basic exhaust system consists of exhaust manifold(s), exhaust pipe with oxygen sensors, catalytic converter(s), heat shield(s), muffler and tailpipe (Fig. 1) (Fig. 2) (Fig. 3) (Fig. 4) (Fig. 5) (Fig. 6)



**Fig. 1 Exhaust Pipe—2.5L Early Build**

- 1 - NUT
- 2 - TRANSMISSION SUPPORT
- 3 - MINI CATALYTIC CONVERTER
- 4 - EXHAUST PIPE
- 5 - EXHAUST MANIFOLD

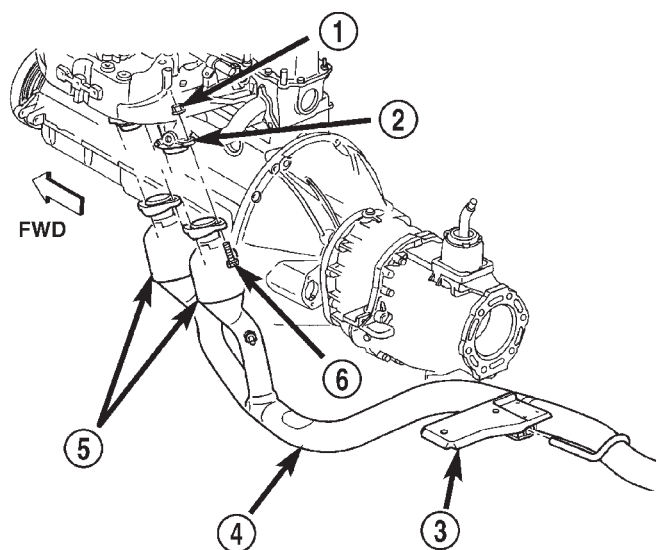


**Fig. 2 Exhaust Pipe—2.5L Late Build**

- 1 - EXHAUST MANIFOLD
- 2 - TRANSMISSION SUPPORT
- 3 - EXHAUST FLANGE JOINT
- 4 - EXHAUST PIPE
- 5 - MINI CATALYTIC CONVERTER
- 6 - NUT

## DESCRIPTION AND OPERATION (Continued)

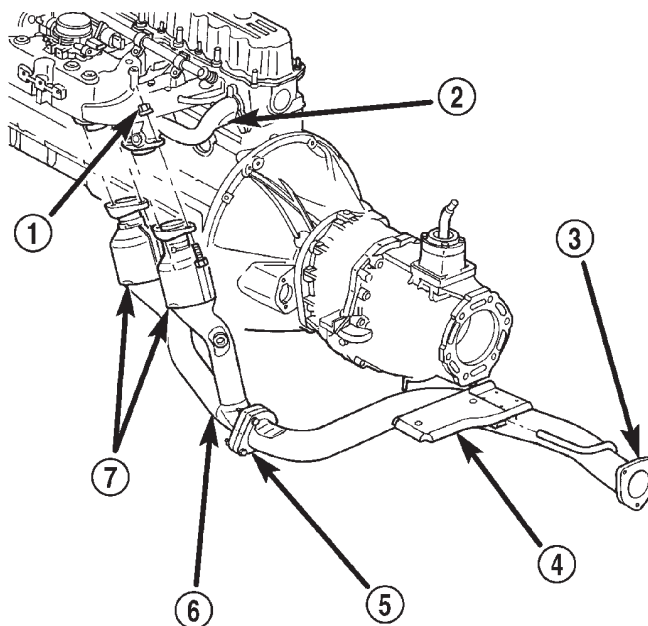
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**Fig. 3 Exhaust Pipe—4.0L Early Build**

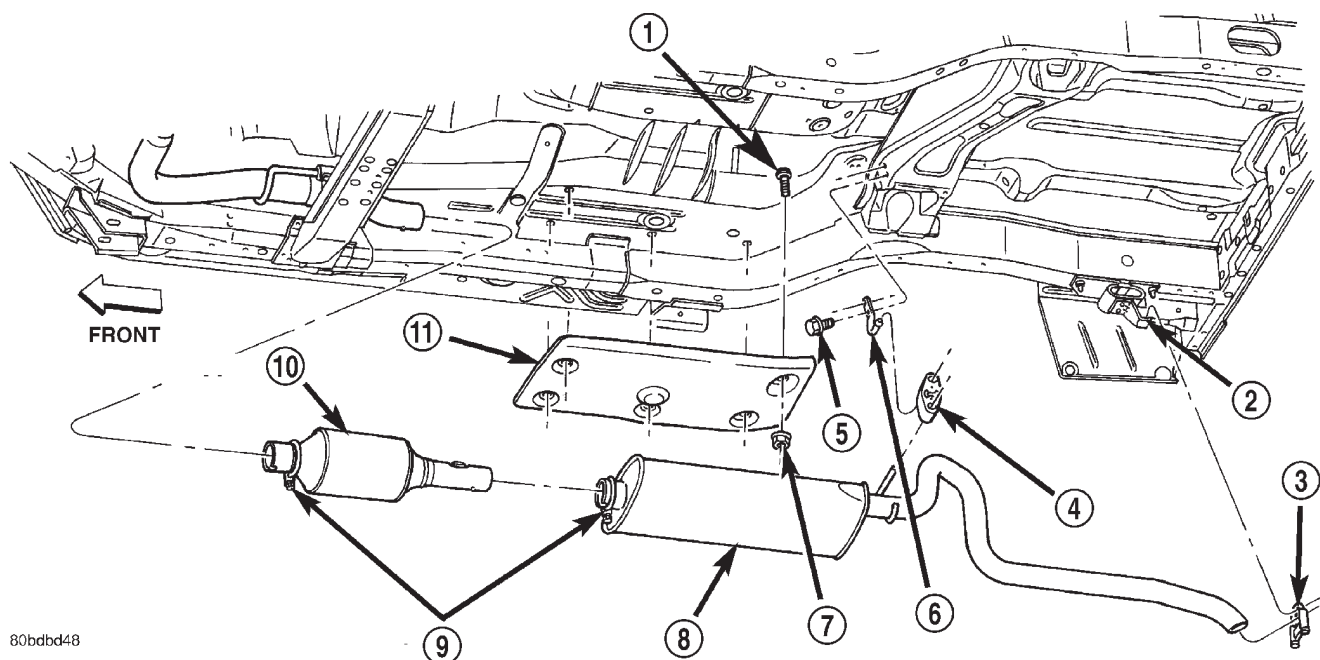
- 1 - NUT
- 2 - EXHAUST MANIFOLD
- 3 - TRANSMISSION SUPPORT
- 4 - EXHAUST PIPE
- 5 - MINI CATALYTIC CONVERTER
- 6 - BOLT



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**Fig. 4 Exhaust Pipe—4.0L Late Build**

- 1 - NUT
- 2 - EXHAUST MANIFOLD
- 3 - EXHAUST FLANGE JOINT
- 4 - TRANSMISSION SUPPORT
- 5 - EXHAUST FLANGE JOINT
- 6 - EXHAUST PIPE
- 7 - MINI CATALYTIC CONVERTER



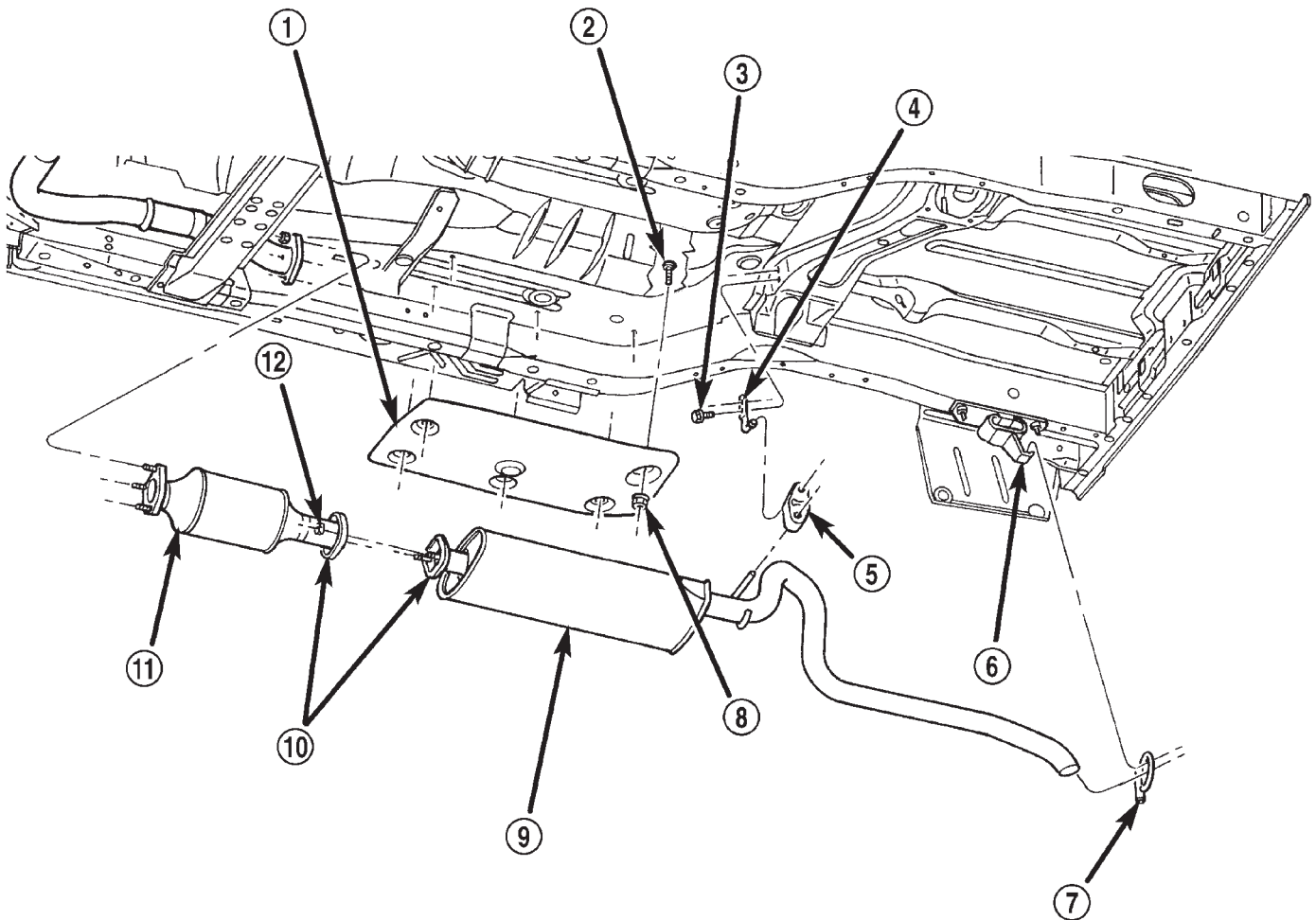
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**Fig. 5 Exhaust System—Typical 2.5L and 4.0L Early Build**

- 1 - STUD
- 2 - TAIL PIPE HANGER
- 3 - CLAMP
- 4 - ISOLATOR
- 5 - BOLT
- 6 - TAIL PIPE HANGER
- 7 - NUT
- 8 - MUFFLER
- 9 - CLAMP
- 10 - CATALYTIC CONVERTER
- 11 - HEAT SHIELD

## DESCRIPTION AND OPERATION (Continued)

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**Fig. 6 Exhaust System—Typical 2.5L and 4.0L Late Build**

- 1 - HEAT SHIELD
- 2 - STUD
- 3 - BOLT
- 4 - TAILPIPE HANGER
- 5 - ISOLATOR
- 6 - TAILPIPE HANGER

- 7 - CLAMP
- 8 - NUT
- 9 - MUFFLER
- 10 - FLANGE JOINT
- 11 - CATALYTIC CONVERTER
- 12 - NUT

## DESCRIPTION AND OPERATION (Continued)

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## CATALYTIC CONVERTERS

## DESCRIPTION

California emissions vehicles incorporate two mini catalytic converters into the exhaust system. These catalytic converters are made of stainless steel designed to operate at extremely high temperatures.

The stainless steel catalytic converter body is designed to last the life of the vehicle. Excessive heat can result in bulging or other distortion, but excessive heat will not be the fault of the converter. If unburned fuel enters the converter, overheating may occur. If a converter is heat-damaged, correct the cause of the damage at the same time the converter is replaced. Also, inspect all other components of the exhaust system for heat damage.

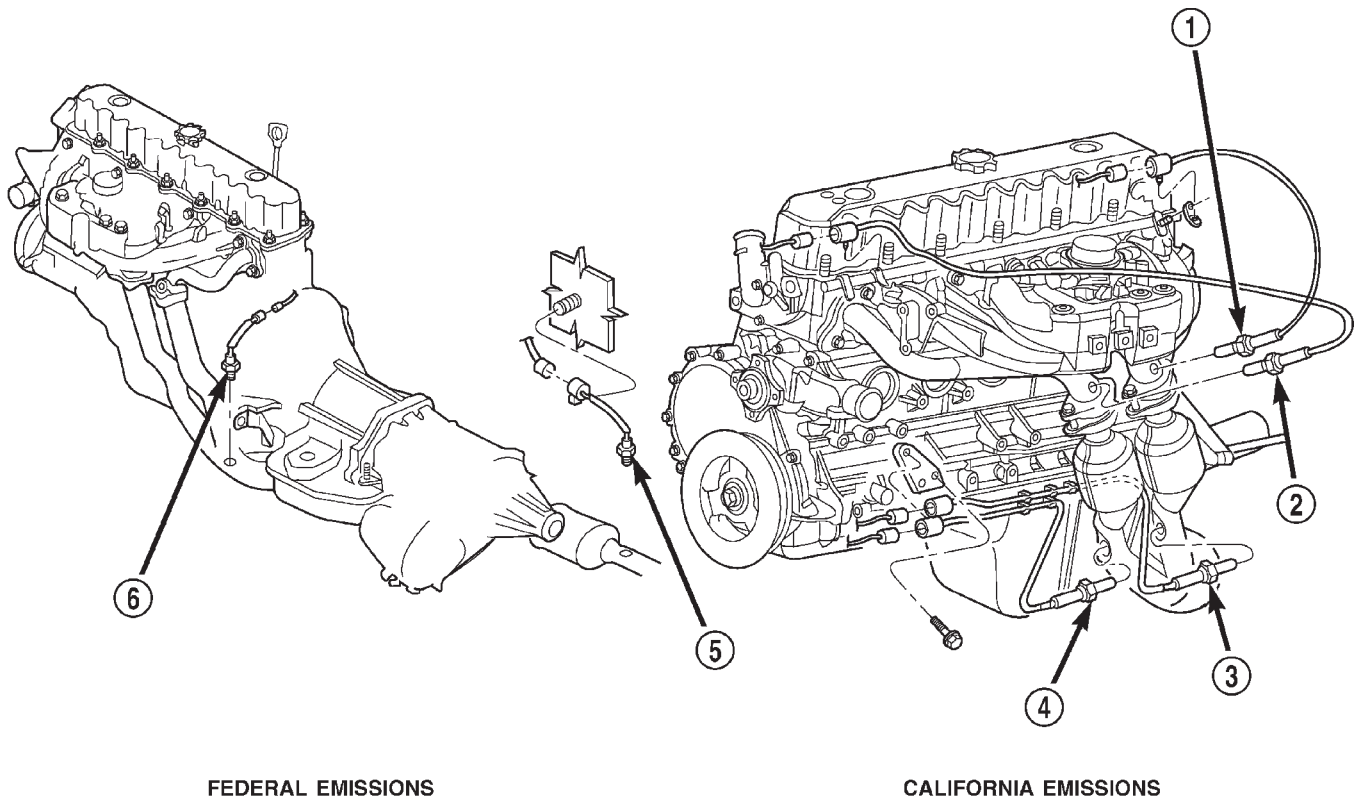
**Unleaded gasoline must be used to avoid contaminating the catalyst core.**

Federal emission vehicles use only one catalytic converter. However, California emission vehicles incorporate two mini catalytic converters located after the exhaust manifolds and before the inline catalytic converter (Fig. 7).

## MUFFLER

## DESCRIPTION

Both the 2.5L and 4.0L engines use a galvanized steel muffler to control exhaust noise levels and exhaust back pressure.



FEDERAL EMISSIONS

CALIFORNIA EMISSIONS

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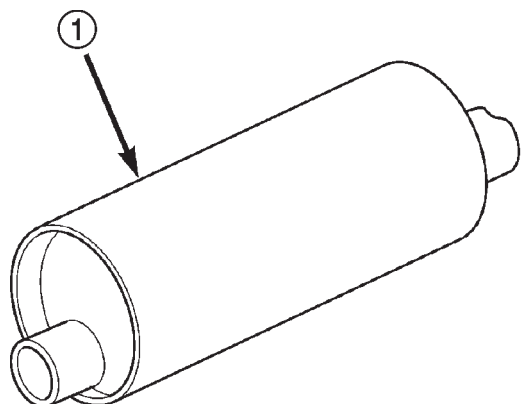
**Fig. 7 4.0L Catalytic Converter and O2 Sensor Configuration—California and Federal Emissions**

- 1 - O2 SENSOR
- 2 - O2 SENSOR
- 3 - O2 SENSOR

- 4 - O2 SENSOR
- 5 - O2 SENSOR
- 6 - O2 SENSOR

## DESCRIPTION AND OPERATION (Continued)

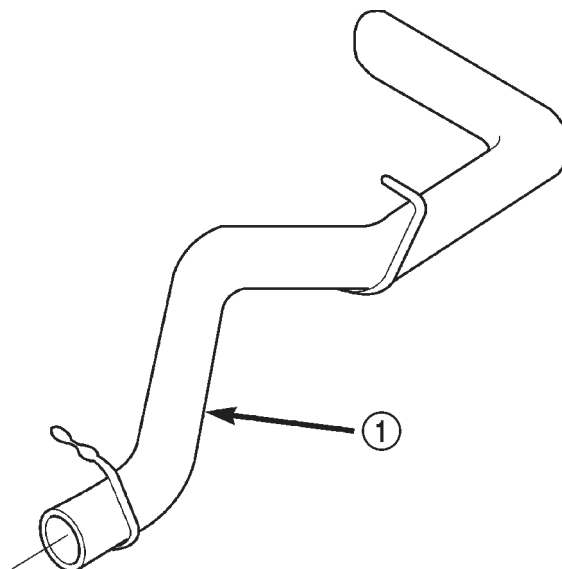
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**Fig. 8 Muffler—Typical**

1 – MUFFLER



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**Fig. 9 Tailpipe—Typical**

1 – TAILPIPE

## TAILPIPE

### DESCRIPTION

The tail pipe is also made of galvanized steel

### OPERATION

The tailpipe channels the exhaust out of the muffler and out from under the vehicle to control noise and prevent exhaust gas fumes from entering the passenger compartment.

## DIAGNOSIS AND TESTING

### EXHAUST SYSTEM

#### EXHAUST SYSTEM DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
EXCESSIVE EXHAUST NOISE OR LEAKING EXHAUST GASES	<ol style="list-style-type: none"> <li>1. Leaks at pipe joints.</li> <li>2. Rusted or blown out muffler.</li> <li>3. Broken or rusted out exhaust pipe.</li> <li>4. Exhaust pipe leaking at manifold flange.</li> <li>5. Exhaust manifold cracked or broken.</li> <li>6. Leak between exhaust manifold and cylinder head.</li> <li>7. Catalytic converter rusted or blown out.</li> <li>8. Restriction in exhaust system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten clamps/bolts to specified torque at leaking joints.</li> <li>2. Replace muffler. Inspect exhaust system.</li> <li>3. Replace exhaust pipe.</li> <li>4. Tighten/replace flange attaching nuts/bolts.</li> <li>5. Replace exhaust manifold.</li> <li>6. Tighten exhaust manifold to cylinder head bolts.</li> <li>7. Replace catalytic converter assy.</li> <li>8. Remove restriction, if possible. Replace restricted part if necessary.</li> </ol>

When servicing and replacing exhaust system components, disconnect the oxygen sensor connector(s). Allowing the exhaust to hang by the oxygen sensor wires will damage the harness and/or sensor.

## REMOVAL AND INSTALLATION

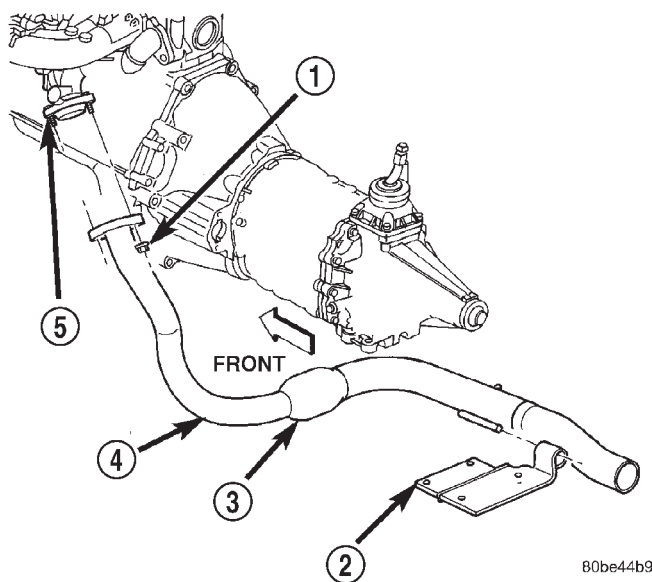
## EXHAUST PIPE—EARLY BUILD

**WARNING:** IF TORCHES ARE USED WHEN WORKING ON THE EXHAUST SYSTEM, DO NOT ALLOW THE FLAME NEAR THE FUEL LINES.

**CAUTION:** When servicing exhaust system components, disconnect the oxygen sensor connector. Allowing the exhaust system to hang by the oxygen sensor harness will damage the wiring and/or sensor.

## REMOVAL

- (1) Raise and support the vehicle.
- (2) Saturate the bolts and nuts with Mopar® Rust Penetrant (Fig. 10) (Fig. 11). Allow 5 minutes for penetration.



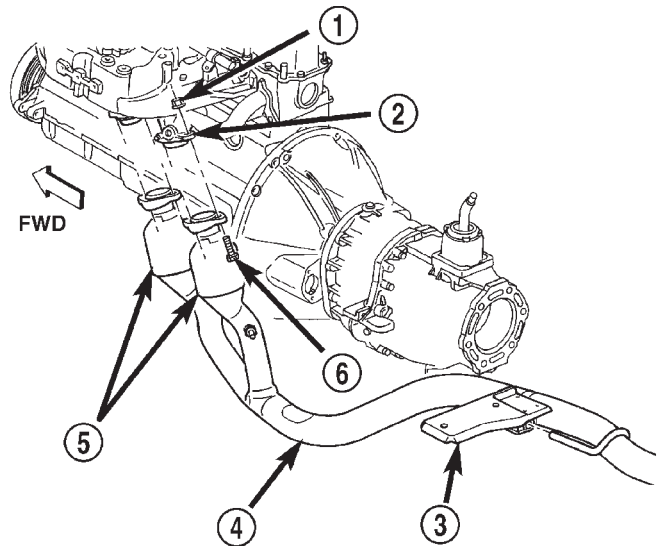
**Fig. 10 Exhaust Pipe Removal—2.5L Early Build**

- 1 - NUT
- 2 - TRANSMISSION SUPPORT
- 3 - MINI CATALYTIC CONVERTER
- 4 - EXHAUST PIPE
- 5 - EXHAUST MANIFOLD

- (3) Disconnect the oxygen sensor connector(s).
- (4) Disconnect the exhaust pipe from the engine exhaust manifold. Discard the seal (4.0L engine, only).

(5) Support the transmission and remove the rear crossmember.

(6) Remove the clamp nuts and clamp. To remove the exhaust pipe from the catalytic converter, apply heat until the metal becomes cherry red. Disconnect



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**Fig. 11 Exhaust Pipe Removal—4.0L Early Build**

- 1 - NUT
- 2 - EXHAUST MANIFOLD
- 3 - TRANSMISSION SUPPORT
- 4 - EXHAUST PIPE
- 5 - MINI CATALYTIC CONVERTER
- 6 - BOLT

the exhaust pipe from the catalytic converter. Remove the exhaust pipe.

## INSTALLATION

(1) Assemble exhaust pipe to manifold and catalytic converter loosely to permit proper alignment of all parts.

(2) Use a new clamp and tighten the nuts to 61 N·m (45 ft. lbs.) torque.

(3) Connect the exhaust pipe to the engine exhaust manifold (Fig. 10) (Fig. 11). Install a new seal between the exhaust manifold and the exhaust pipe (4.0L engine only). Tighten the nuts to 31 N·m (23 ft. lbs.) torque.

(4) Install the rear crossmember. Install and tighten the four (4) crossmember to rear mount nuts to 22 N·m (16 ft. lbs.) Install and tighten the crossmember to sill bolts to 42 N·m (31 ft. lbs.) torque. Remove the support from the transmission.

(5) Carefully coat the threads on the oxygen sensor(s) with anti-seize compound. Install the sensor and tighten the nut to 27 N·m (20 ft. lbs.) torque.

(6) Lower the vehicle.

(7) Start the engine and inspect for exhaust leaks and exhaust system contact with the body panels. Adjust the alignment, if needed.



## REMOVAL AND INSTALLATION (Continued)

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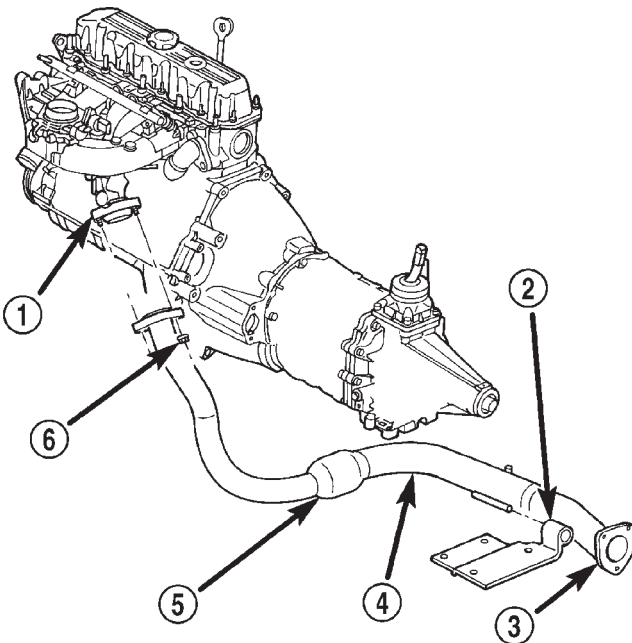
## EXHAUST PIPE—LATE BUILD

**WARNING: IF TORCHES ARE USED WHEN WORKING ON THE EXHAUST SYSTEM, DO NOT ALLOW THE FLAME NEAR THE FUEL LINES.**

**CAUTION:** When servicing exhaust system components, disconnect the oxygen sensor connector. Allowing the exhaust system to hang by the oxygen sensor harness will damage the wiring and/or sensor.

## REMOVAL

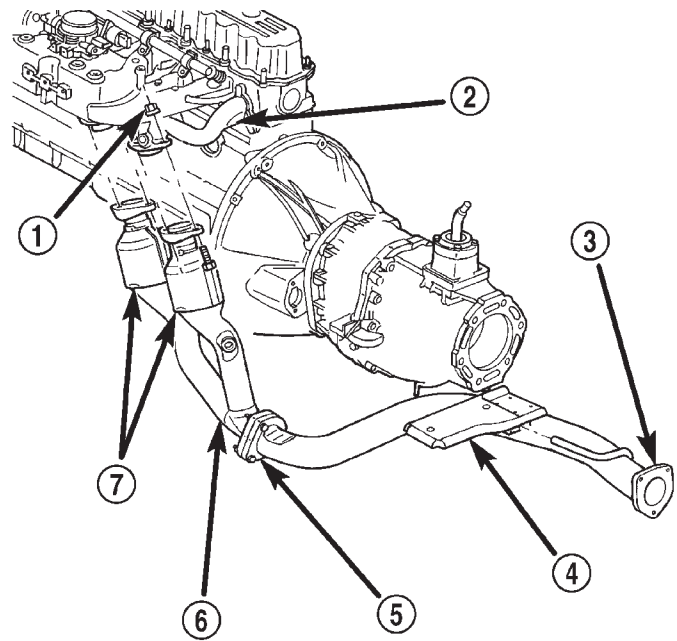
- (1) Raise and support the vehicle.
- (2) Saturate the bolts and nuts with Mopar® Rust Penetrant. Allow 5 minutes for penetration.
- (3) Disconnect the oxygen sensor connector(s).
- (4) Disconnect the exhaust pipe from the engine exhaust manifold (Fig. 12) (Fig. 13).
- (5) Disconnect the exhaust flange at the exhaust pipe to catalytic converter
- (6) Slide the exhaust pipe toward rear of vehicle to disengage exhaust hanger from transmission support. Remove exhaust pipe.



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**Fig. 12 Exhaust Pipe Removal—2.5L Late Build**

- 1 - EXHAUST MANIFOLD
- 2 - TRANSMISSION SUPPORT
- 3 - EXHAUST FLANGE JOINT
- 4 - EXHAUST PIPE
- 5 - MINI CATALYTIC CONVERTER
- 6 - NUT



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**Fig. 13 Exhaust Pipe Removal—4.0L Late Build**

- 1 - NUT
- 2 - EXHAUST MANIFOLD
- 3 - EXHAUST FLANGE JOINT
- 4 - TRANSMISSION SUPPORT
- 5 - EXHAUST FLANGE JOINT
- 6 - EXHAUST PIPE
- 7 - MINI CATALYTIC CONVERTER

## INSTALLATION

- (1) Position exhaust pipe into vehicle.
- (2) Position exhaust hanger into transmission support.
- (3) Position exhaust pipe onto exhaust manifold (Fig. 12) (Fig. 13). Install mounting nuts and bolts. **DO NOT** tighten nuts and bolts at this time.
- (4) Position catalytic converter flange onto exhaust pipe flange. Install three nuts and tighten to 28.5 N·m (21 ft. lbs.).
- (5) Tighten exhaust pipe to exhaust manifold mounting bolts and nuts to 31 N·m (23 ft. lbs.).
- (6) Connect the oxygen sensor connector(s).
- (7) Lower vehicle.
- (8) Start engine check for leaks.

## CATALYTIC CONVERTER—EARLY BUILD

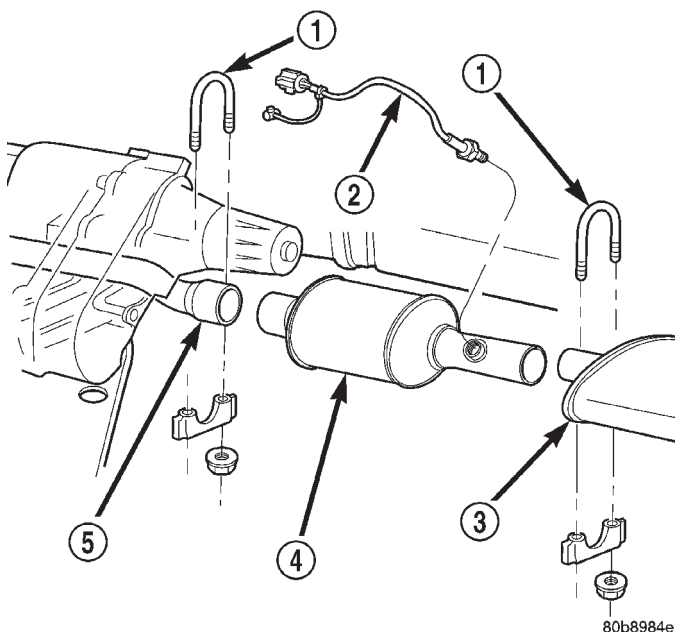
**WARNING: IF TORCHES ARE USED WHEN WORKING ON THE EXHAUST SYSTEM, DO NOT ALLOW THE FLAME NEAR THE FUEL LINES.**

## REMOVAL AND INSTALLATION (Continued)

**CAUTION:** When servicing exhaust system components, disconnect the oxygen sensor connector. Allowing the exhaust system to hang by the oxygen sensor harness will damage the wiring and/or sensor.

## REMOVAL

- (1) Raise and support the vehicle.
- (2) Remove the clamps from the catalytic converter and muffler connection (Fig. 14).
- (3) Disconnect and remove the oxygen sensor from the catalytic converter.
- (4) Heat the catalytic converter and muffler connection with an oxyacetylene torch until the metal becomes cherry red.
- (5) While the metal is still cherry red, twist the muffler assembly back and forth to separate it from the catalytic converter.
- (6) Disconnect the exhaust pipe from the catalytic converter (Fig. 14). If needed, heat up the pipes to separate.



**Fig. 14 Catalytic Converter to Muffler and Exhaust Pipe Connection—Early Build**

- 1 - EXHAUST CLAMP ASSEMBLY
- 2 - OXYGEN SENSOR
- 3 - MUFFLER
- 4 - CATALYTIC CONVERTER
- 5 - EXHAUST PIPE

## INSTALLATION

- (1) Connect the catalytic converter to the exhaust pipe and the muffler/tailpipe assy. (Fig. 14). Use a new clamp and tighten the nuts to 61 N·m (45 ft. lbs.) torque.
- (2) Install the muffler onto the catalytic converter until the alignment tab is inserted into the alignment slot.
- (3) Install a new clamp at the muffler and catalytic converter connection (Fig. 14). Tighten the clamp nut to 61 N·m (45 ft. lbs.) torque.
- (4) Coat the oxygen sensor with anti-seize compound. Install the sensor and tighten the nut to 27 N·m (20 ft. lbs.) torque.
- (5) Lower the vehicle.
- (6) Start the engine and inspect for exhaust leaks and exhaust system contact with the body panels. Adjust the alignment, if needed.

## CATALYTIC CONVERTER—LATE BUILD

**WARNING:** IF TORCHES ARE USED WHEN WORKING ON THE EXHAUST SYSTEM, DO NOT ALLOW THE FLAME NEAR THE FUEL LINES.

**CAUTION:** When servicing exhaust system components, disconnect the oxygen sensor connector. Allowing the exhaust system to hang by the oxygen sensor harness will damage the wiring and/or sensor.

## REMOVAL

- (1) Raise and support the vehicle.
- (2) Disconnect and remove the oxygen sensor from the catalytic converter.
- (3) Saturate the bolts and nuts with Mopar® Rust Penetrant. Allow 5 minutes for penetration.
- (4) Remove the nuts and bolts then disconnect the catalytic converter flange from the muffler flange.
- (5) Remove the nuts from the catalytic converter to exhaust pipe flange and remove catalytic converter and gasket from vehicle (Fig. 15).

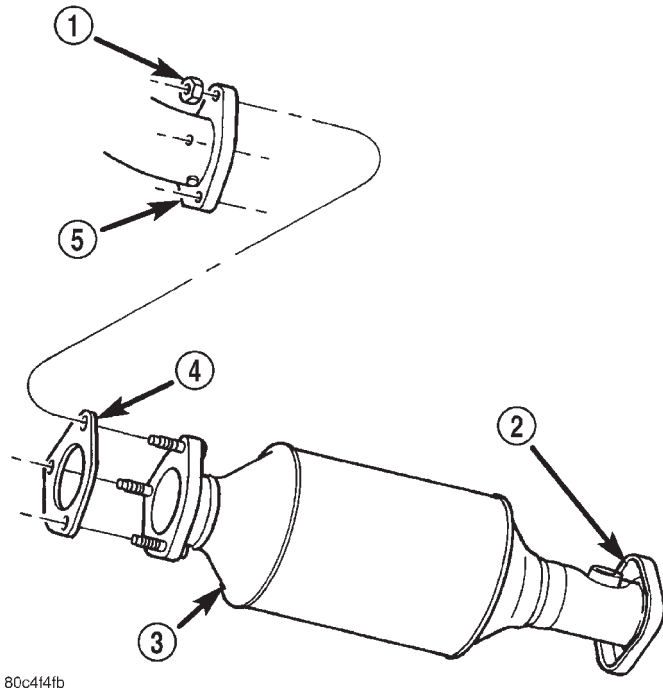
## INSTALLATION

- (1) Position a new gasket then position catalytic converter onto exhaust pipe (Fig. 15), install three mounting nuts. **DO NOT** tighten nuts at this time.
- (2) Position muffler flange onto catalytic converter flange and install nuts and bolts. Tighten Nuts to 28.5 N·m (21 ft. lbs.).



## REMOVAL AND INSTALLATION (Continued)

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**Fig. 15 Catalytic Converter—Late Build**

- 1 - NUT
- 2 - CATALYTIC CONVERTER TO MUFFLER FLANGE JOINT
- 3 - CATALYTIC CONVERTER
- 4 - GASKET
- 5 - EXHAUST PIPE FLANGE JOINT

(3) Tighten catalytic converter to exhaust pipe flange mounting nuts to 28.5 N·m (21 ft. lbs.).

(4) Install oxygen sensor into catalytic converter. Connect oxygen sensor.

(5) Lower vehicle.

(6) Start engine check for leaks.

### MUFFLER AND TAILPIPE—EARLY BUILD

All original equipment exhaust systems are manufactured with the exhaust tailpipe welded to the muffler. Service replacement mufflers and exhaust tailpipes are either clamped together or welded together.

**WARNING: IF TORCHES ARE USED WHEN WORKING ON THE EXHAUST SYSTEM, DO NOT ALLOW THE FLAME NEAR THE FUEL LINE.**

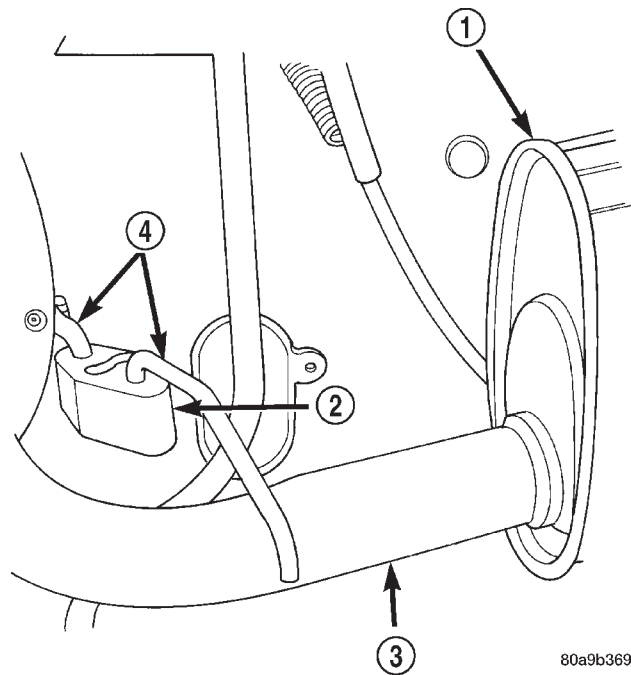
**CAUTION:** When servicing exhaust system components, disconnect the oxygen sensor connector. Allowing the exhaust system to hang by the oxygen sensor harness will damage the wiring and/or sensor.

### REMOVAL

(1) Raise and support the vehicle.

(2) Disconnect front tailpipe hanger from the insulator (Fig. 16).

(3) Remove the front exhaust clamp from the catalytic converter and muffler connection (Fig. 17).



**Fig. 16 Front Exhaust Tailpipe Hanger**

- 1 - MUFFLER
- 2 - INSULATOR
- 3 - TAILPIPE
- 4 - FRONT TAILPIPE HANGER

(4) Heat the catalytic converter-to-muffler connection with an oxyacetylene torch until the metal becomes cherry red.

(5) While the metal is still cherry red, remove the exhaust muffler/tailpipe assembly from the catalytic converter.

(6) Slide the muffler/tailpipe assy. rearward and out of the rear exhaust tailpipe mounting bracket (Fig. 17).

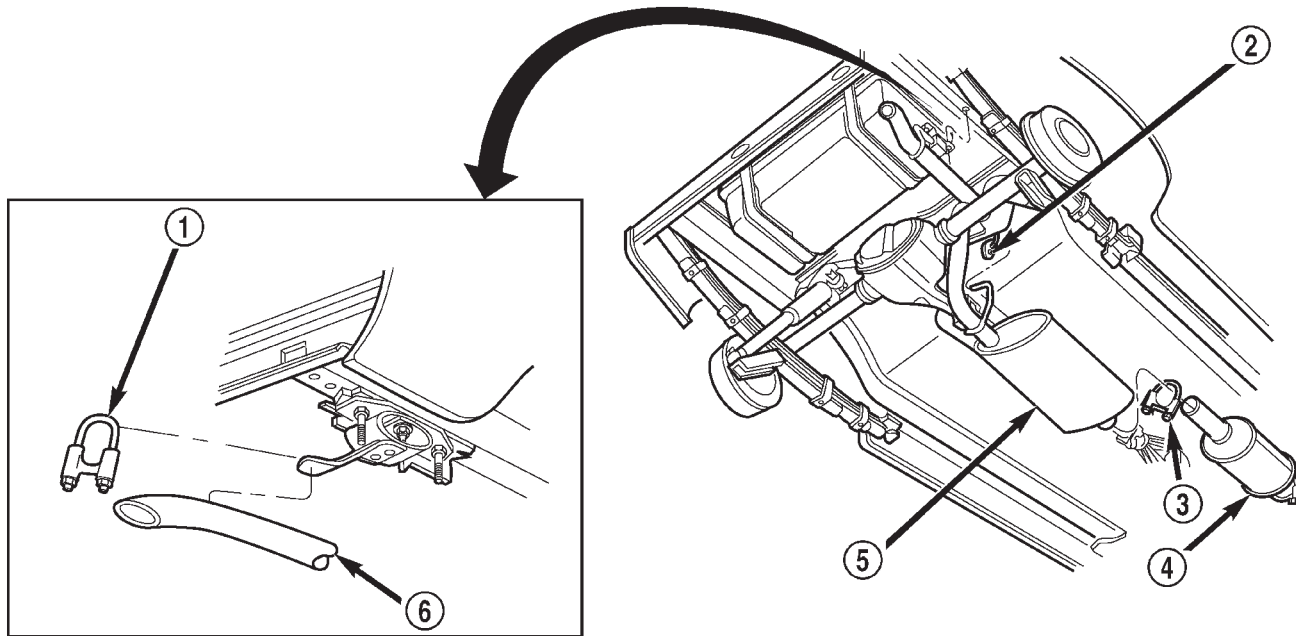
(7) Remove the muffler from the exhaust tailpipe:

- To remove an original equipment exhaust muffler/tailpipe combination, cut the exhaust tailpipe close to the muffler. Collapse the part remaining in the muffler and remove.

- To remove a service exhaust tailpipe/muffler combination, apply heat until the metal becomes cherry red. Remove the exhaust tailpipe/muffler clamp and twist the exhaust tailpipe out of the muffler.

## REMOVAL AND INSTALLATION (Continued)

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**Fig. 17 Muffler/Tailpipe Removal and Installation—Early Build**

- 1 - TAIL PIPE HANGER CLAMP
- 2 - MUFFLER AND TAIL PIPE HANGER
- 3 - CLAMP

- 4 - CATALYTIC CONVERTER
- 5 - MUFFLER AND TAIL PIPE ASSEMBLY
- 6 - TAIL PIPE

## INSTALLATION

(1) Install the muffler onto the catalytic converter. Install the clamp and tighten the nut finger tight.

(2) Install the exhaust tailpipe into the rear of the muffler.

(3) Install the exhaust tailpipe/muffler assembly on the rear exhaust tailpipe mounting bracket. Make sure that the exhaust tailpipe has sufficient clearance from the floor pan.

(4) Install front tailpipe hanger into the insulator (Fig. 16).

(5) Align the muffler and tighten the nuts on the muffler-to-catalytic converter clamp to 61 N·m (45 ft. lbs.) torque (Fig. 17).

(6) Align the tailpipe and install a new clamp at the muffler to tailpipe connection.

(7) Tighten the muffler to tailpipe clamp to 61 N·m (45 ft. lbs.).

(8) Lower the vehicle.

(9) Start the engine and inspect for exhaust leaks and exhaust system contact with the body panels. Adjust the alignment, if needed.

## MUFFLER AND TAILPIPE—LATE BUILD

All original equipment exhaust systems are manufactured with the exhaust tailpipe welded to the muffler. Service replacement mufflers and exhaust tailpipes are either clamped together or welded together.

**WARNING: IF TORCHES ARE USED WHEN WORKING ON THE EXHAUST SYSTEM, DO NOT ALLOW THE FLAME NEAR THE FUEL LINE.**

**CAUTION: When servicing exhaust system components, disconnect the oxygen sensor connector. Allowing the exhaust system to hang by the oxygen sensor harness will damage the wiring and/or sensor.**

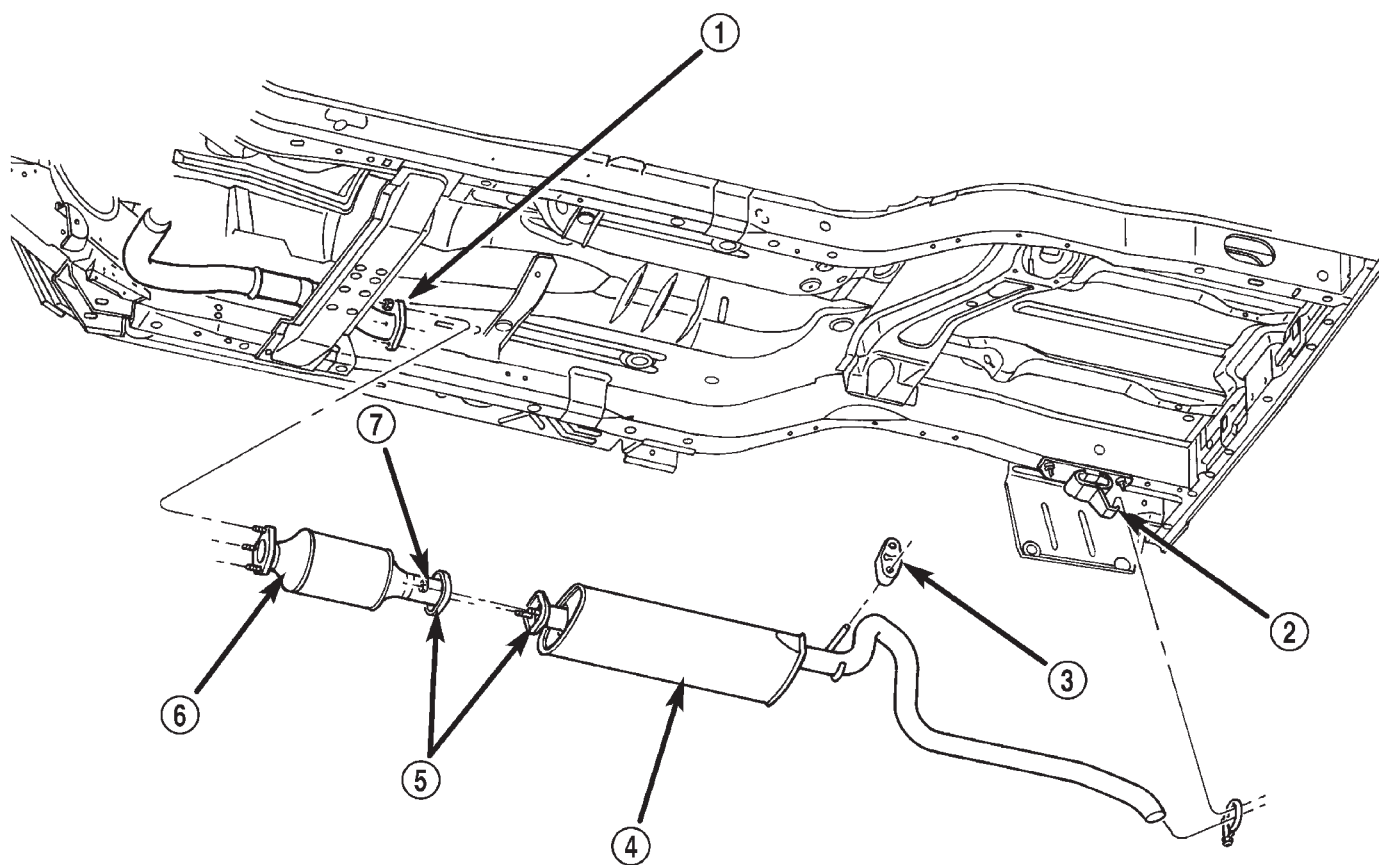
## REMOVAL AND INSTALLATION (Continued)

## REMOVAL

- (1) Raise and support the vehicle.
- (2) Disconnect front tailpipe hanger from the insulator (Fig. 18).
- (3) Remove the mounting nuts from the muffler to catalytic converter flange (Fig. 18).
- (4) Remove the clamp retaining the tailpipe to the rear tailpipe hanger (Fig. 18).
- (5) Remove the muffler and tailpipe assembly from the vehicle.

## INSTALLATION

- (1) Position muffler and tailpipe assembly into vehicle.
- (2) Install clamp retaining tailpipe to the rear tailpipe hanger (Fig. 18). **DO NOT** tighten clamp at this time.
- (3) Install mounting nuts onto the muffler to catalytic converter flange studs (Fig. 18). **DO NOT** tighten nuts at this time.



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**Fig. 18 Muffler/Tailpipe Removal and Installation—Late Build**

- 1 - EXHAUST PIPE FLANGE JOINT
- 2 - REAR TAILPIPE HANGER
- 3 - FRONT TAILPIPE HANGER
- 4 - MUFFLER

- 5 - FLANGE JOINT
- 6 - CATALYTIC CONVERTER
- 7 - NUT

## REMOVAL AND INSTALLATION (Continued)

(4) Make sure the exhaust system is in proper alignment. There should be at least 25mm (1 inch) clearance between the exhaust components and any surrounding components.

(5) Tighten muffler to catalytic converter flange mounting nuts to 28.5 N·m (21 ft. lbs.).

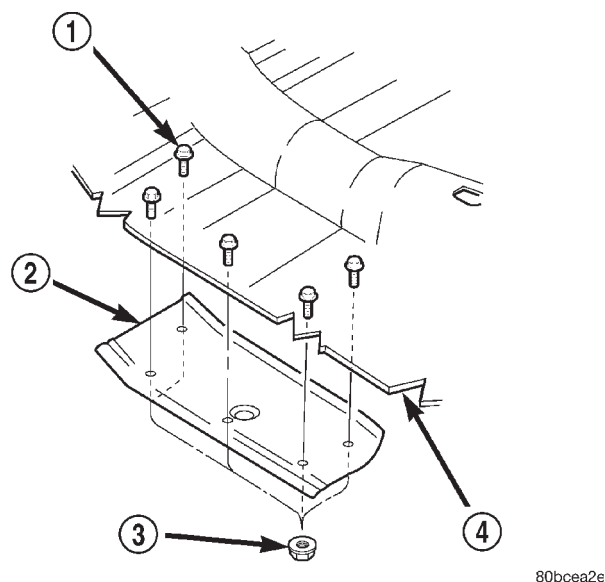
(6) Tighten tailpipe clamp to 48 N·m (35 ft. lbs.).

## HEAT SHIELDS

## REMOVAL

(1) Raise and support the vehicle.

(2) Remove the screws and/or nuts holding the heat shields to the frame and/or floor pan (Fig. 19).



**Fig. 19 Heat Shield Removal/Installation**

- 1 - BOLTS
- 2 - MUFFLER HEAT SHIELD
- 3 - NUTS
- 4 - FLOOR PAN

(3) When removing muffler heat shield, the muffler front support bracket must be removed first.

(4) Slide the shields out around the exhaust system.

## INSTALLATION

(1) Position the heat shields to the floor pan or the frame and install the screws and/or nuts.

(2) Tighten the nuts and/or screws to 45 N·m (33 ft. lbs.) (Fig. 19).

(3) Lower the vehicle.

## SPECIFICATIONS

## TORQUE SPECIFICATIONS

DESCRIPTION	N·m	Ft. Lbs.	In. Lbs.
Catalytic Converter/Exhaust Pipe			
Exhaust Clamp—Nuts	61	45	—
Crossmember to Sill—Bolts	42	31	—
Crossmember to Transmission Mount—Nuts	22	16	—
Exhaust Pipe to Manifold—Nuts Early Build	31	23	—
Exhaust Manifold to Engine 2.5L			
Engine—			
Bolt #1	41	40	—
Bolts #2–5	31	23	—
Nuts #6&7	31	23	—
Exhaust Manifold to Engine 4.0L			
Engine—			
Nuts #6&7	31	23	—
Nuts/Bolts #1,2,3,4,5,8,9,10&11	33	24	—
Muffler to Catalytic Converter—Exhaust Clamp Nut Early Build	61	45	—
Exhaust Pipe to Catalytic Converter Flange—Nuts Late Build	28.5	21	—
Muffler to Catalytic Converter Flange—Nuts Late Build	28.5	21	—
Tailpipe to Rear Tailpipe Hanger—Clamp Late Build	48	35	—
Tailpipe to Rear Tailpipe Hanger—Clamp Early Build	27	20	—
Oxygen Sensors	27	20	—