

## 1.6 ROCKER COVER

The rocker cover completely encloses the valve and injector operating mechanism on top of the cylinder head (and in some cases an engine brake), including the overhead camshaft.

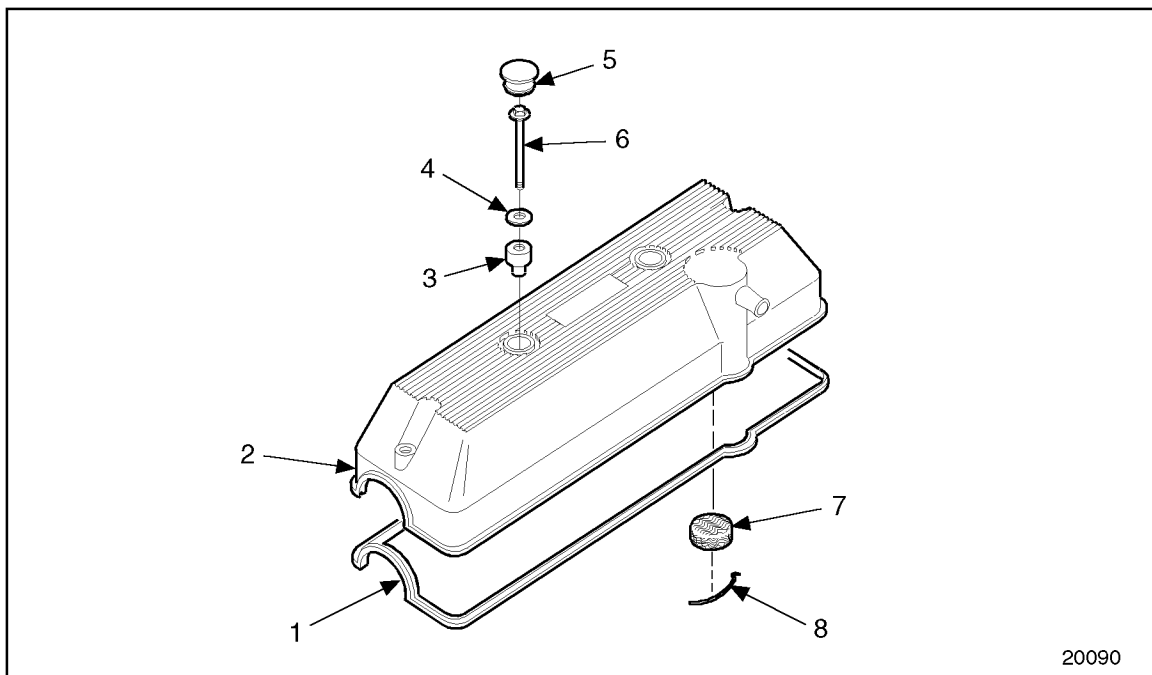
Depending on the installation, the rocker cover may be a one-piece, two-piece or three-piece design. See Figure 1-103, see Figure 1-104, and see Figure 1-105.

The one-piece rocker cover is molded of a sound-dampening, fiberglass-reinforced, synthetic material. It is internally ribbed to distribute the hold-down bolt clamp load for effective, full perimeter sealing. See Figure 1-102.

Effective July 1993, a breather baffle is installed on the low-profile aluminum rocker cover.

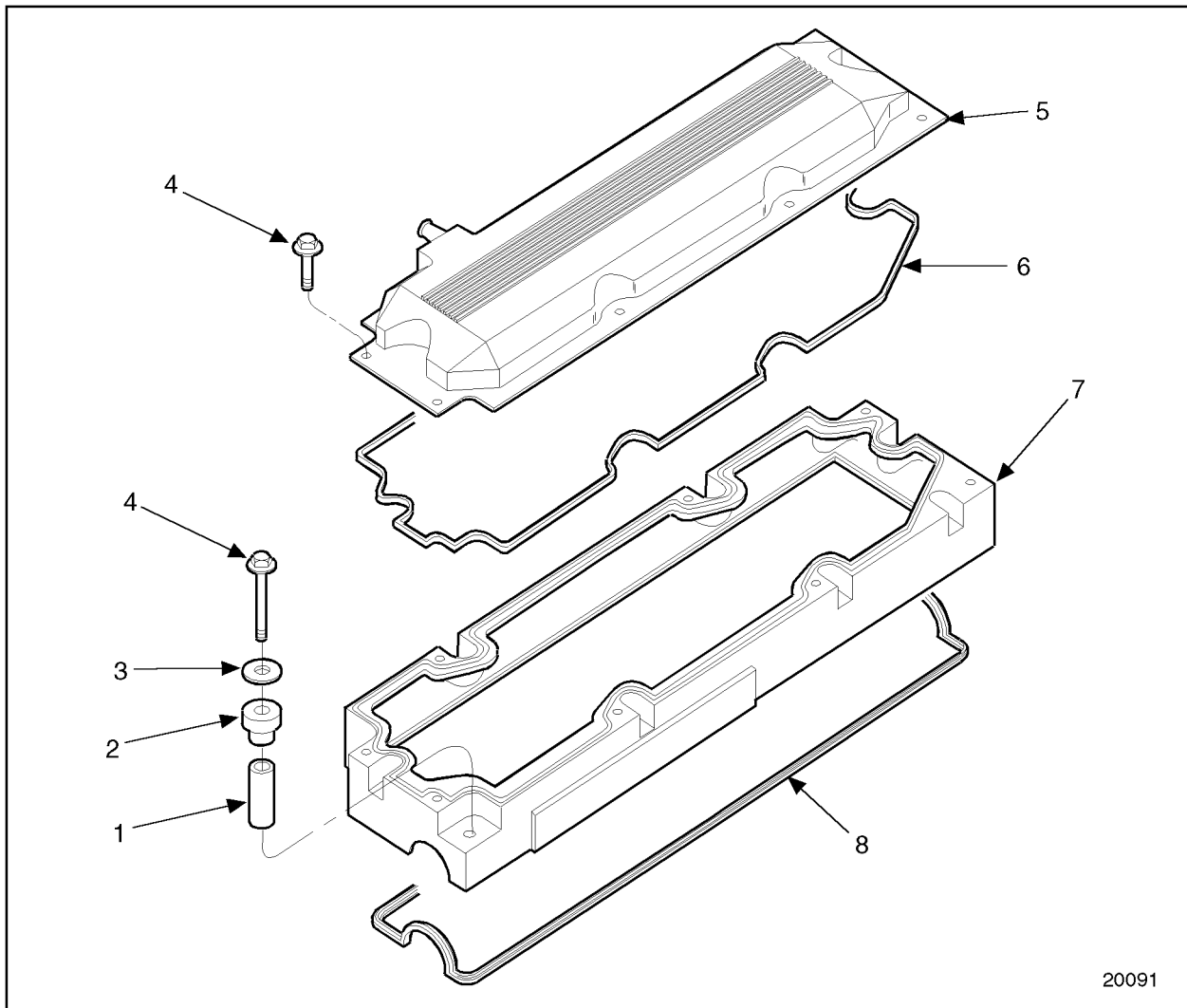
### NOTE:

**Effective May 1999, all Series 60 engines are built with a reusable rocker cover gasket. This gasket does not need to be replaced at the time of removal provided there is not any damage observed.**



- |                 |               |
|-----------------|---------------|
| 1. Gasket       | 5. Cover Plug |
| 2. Rocker Cover | 6. Bolt       |
| 3. Isolator     | 7. Element    |
| 4. Washer       | 8. Clip       |

**Figure 1-102 One-piece Rocker Cover - Series 60 Diesel Engine**

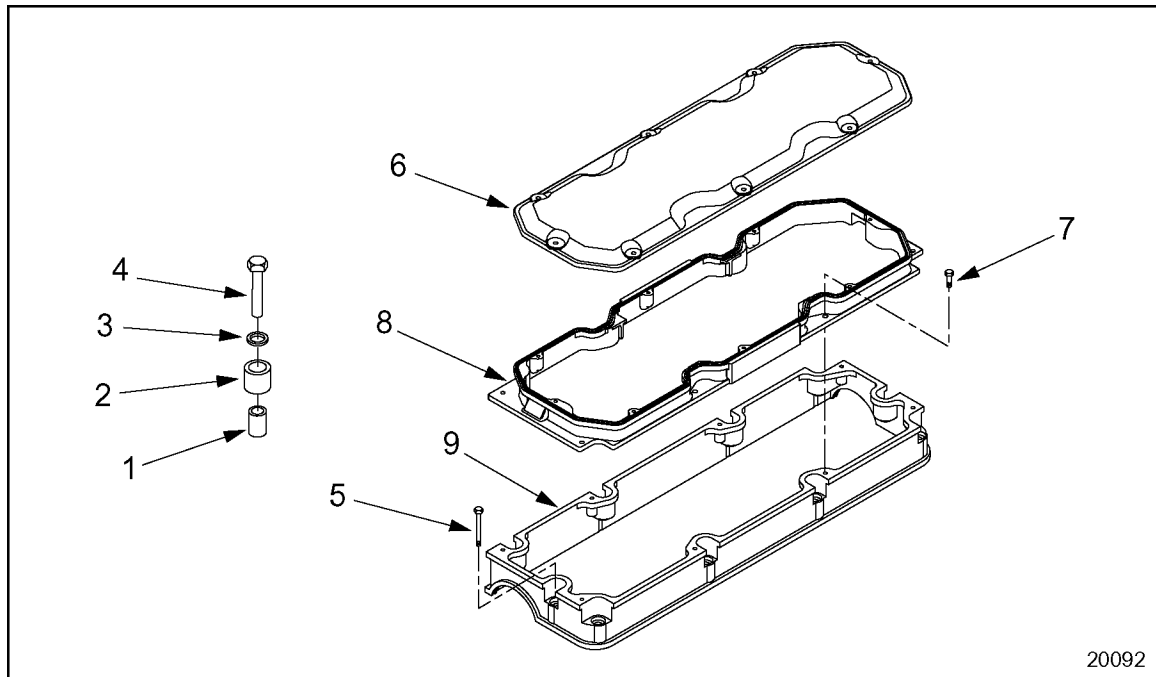


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- 1. Limiting Sleeve
- 2. Isolator
- 3. Washer
- 4. Bolt
- 5. Rocker Cover Cap
- 6. Diamond-Shaped Seal
- 7. Rocker Cover Base
- 8. Isolator Rim Seal

**Figure 1-103 Two-piece Rocker Cover - Series 60 Diesel Engine**

The three-piece rocker cover is similar to the two-piece cover but with an additional intermediate cover and diamond seal and new cover cap. See Figure 1-107.



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|--------------------|-----------------------|
| 1. Limiting Sleeve | 6. Rocker Cover Cap   |
| 2. Isolator        | 7. Bolt               |
| 3. Washer          | 8. Intermediate Cover |
| 4. Bolt            | 9. Rocker Cover Base  |
| 5. Bolt            |                       |

**Figure 1-107 Three-piece Rocker Cover**

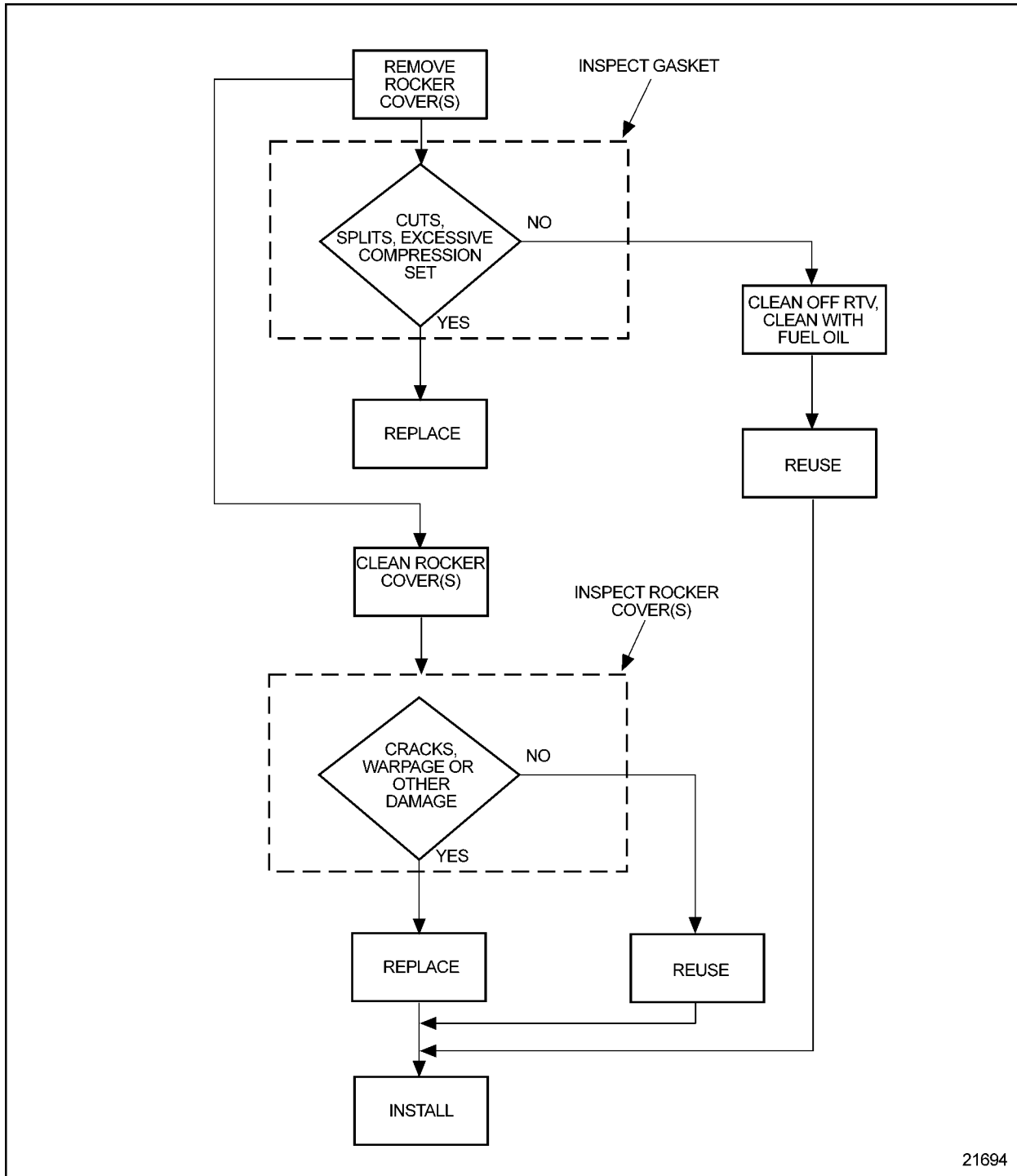
Two caps are available with the Series 60 diesel engines. One is for use with a Jake Brake<sup>®</sup>, and one without a Jake Brake<sup>®</sup>.

Only one cap is available with the Series 60G engines.

The rocker cover base is attached to the cylinder head using ten assemblies consisting of a bolt, limiter sleeve, isolator and flat washer. All rocker covers use a silicone rim seal, seated in a groove around the bottom edge of the rocker cover base to provide an effective oil seal. The one-piece and two-piece design rocker covers incorporate a crankcase ventilation breather outlet. The three-piece design and the Series 60G cap incorporate a combination filler/breather at the camshaft cover (gear case cover) position.

### 1.6.1 Repair or Replacement of Rocker Cover

To determine if repair is possible or replacement is necessary, perform the following procedure. See Figure 1-108.



**Figure 1-108** Flowchart for Repair or Replacement of Rocker Cover

## 1.6.2 Removal and Cleaning of One-piece Rocker Cover For Diesel Engines Only

Preclean the rocker cover, especially around its seat on the head, and in the attaching bolt recesses, to keep dirt and debris out of the valve gear chamber.

Perform the following steps to remove the one-piece rocker cover:

1. Remove the center plugs, hold-down bolts, washers and isolators.
2. Lift the rocker cover straight up off the engine.

### 1.6.2.1 Cleaning and Inspection of the One-piece Rocker Cover For Diesel Engines Only

Inspect the rocker cover as follows:

1. Remove the breather element and retainer clip.

<b>NOTICE:</b>
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To avoid damaging the silicone isolators, do not clean them with mineral spirits, fuel oil or any petroleum based solvents.
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2. Remove bolt assemblies and isolators and clean in detergent and water solution.
3. Remove gasket from rocker cover and clean the gasket and rocker cover. Remove old RTV sealant from the corners of the gasket and clean the gasket and rocker cover components in clean fuel oil.

**NOTE:**

Pay special attention to the breather element. Clean thoroughly or replace as required.

 <b>CAUTION:</b>
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<b>To avoid injury from flying debris when using compressed air, wear adequate eye protection (face shield or safety goggles) and do not exceed 40 psi (276 kPa) air pressure.</b>
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4. Blow dry with compressed air.
5. Clean the breather recess in the rocker cover.
6. Check for damage. Replace as necessary.
7. Reinstall the breather element and retainer clip.

### 1.6.3 Removal and Cleaning of Two-piece Rocker Cover For Diesel Engines Only

Preclean the two piece rocker cover, especially around its seat on the head, and in the attaching bolt recesses, to keep dirt and debris out of the valve gear chamber.

Perform the following steps to remove the two-piece rocker cover:

1. Remove the eight screws that attach the rocker cover cap to the base.
2. Lift the cap off the base.
3. Loosen and remove the ten bolt and isolator assemblies that attach the base to the cylinder head.
4. Lift the base straight up off the cylinder head.

#### 1.6.3.1 Inspection of Two-piece Rocker Cover

Perform the following steps to inspect the two-piece valve rocker cover which has a removable breather housing:

1. Remove the three screws and retainer that retains the breather housing.
2. Remove the breather housing, seal, and wire mesh element.
3. Wash the components in clean fuel oil.

**CAUTION:**


**To avoid injury from flying debris when using compressed air, wear adequate eye protection (face shield or safety goggles) and do not exceed 40 psi (276 kPa) air pressure.**

4. Blow dry with compressed air.

Before inspecting the rocker cover, clean the isolators as follows:

<b>NOTICE:</b>
To avoid damaging isolators, do not use solvents of any kind, or any petroleum distillates to clean them. The isolators can be cleaned with mild soap and water if necessary. Install new seals and isolators clean and dry.

1. Wash isolators with mild soap and water.

 <b>CAUTION:</b>
<b>To avoid injury from flying debris when using compressed air, wear adequate eye protection (face shield or safety goggles) and do not exceed 40 psi (276 kPa) air pressure.</b>

2. Be sure to completely dry gasket grooves in the rocker cover with compressed air.
3. Use new gaskets (do not reuse old gaskets).


<b>NOTICE:</b>
Reuse gaskets with manufacturing date after May 28, 1999.

4. Inspect the lower rocker cover base-to-cylinder head gasket for damage replace if gasket is damaged.
5. If gasket is not damaged clean off excess RTV, clean gasket with clean fuel oil dry completely and reuse part.

### 1.6.5.1 Inspection of Three-piece Rocker Cover

Inspect the three-piece valve cover as follows:

1. Wash the components in clean fuel oil.

 <b>CAUTION:</b>
<b>To avoid injury from flying debris when using compressed air, wear adequate eye protection (face shield or safety goggles) and do not exceed 40 psi (276 kPa) air pressure.</b>

2. Blow dry with compressed air.
3. Clean the breather recess in the rocker cover.
4. Check for damage. Replace as necessary.

### 1.6.6 Disassembly of Rocker Cover

Disassemble the rocker cover as follows:

1. Disengage the clip that holds the crankcase vent breather element in the valve cover by pressing the center of the spring steel retaining clip outward and removing the straight end.
2. Rotate the clip upward to remove the curved end.
3. Remove the wire mesh element.

### 1.6.7 Pre-installation of Rocker Cover

Perform the following steps prior to installing the rocker cover:

1. Install the rocker cover seal in corners of the camshaft cap section (arch at each end of the valve cover) first.

#### NOTE:

Be sure the rocker cover grooves and the seals are clean, free of oil and dry.

2. Install the cam cap section, starting in the center, by pushing the seal into the groove at the top of the arch. Then install each section at its halfway point. Seat the seal completely around the arch. Be sure the corners are still firmly seated after the arch is completed. They should present a square corner parallel to the rocker cover rail. Repeat this procedure for the cam cap section on the other end. See Figure 1-110.

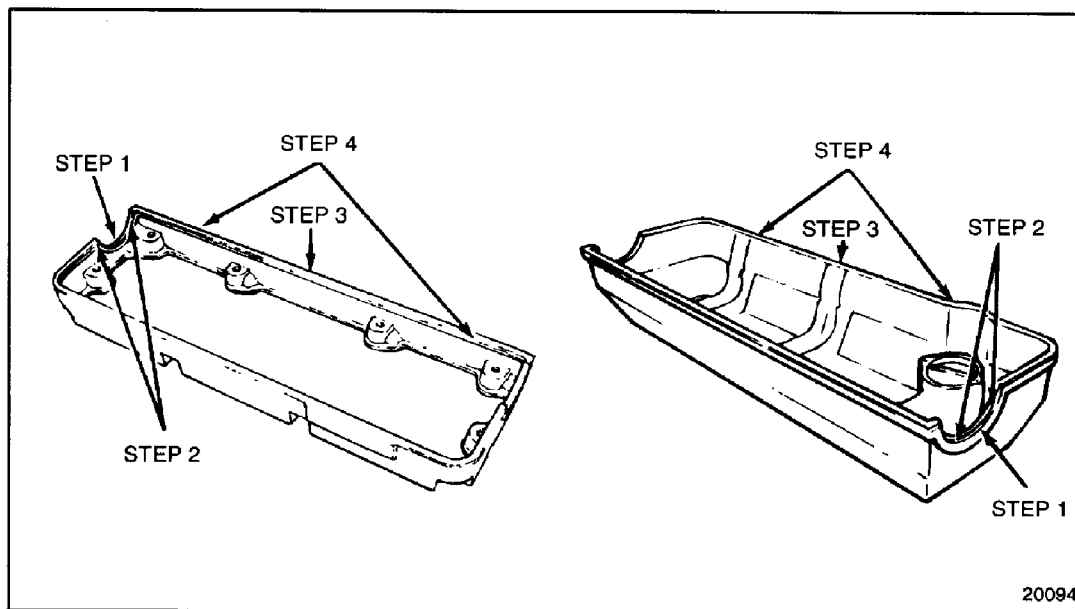


Figure 1-110 Rocker Cover Gasket Installation