Table 14-4: Engine Firing Order

<table>
<thead>
<tr>
<th></th>
<th>Right Hand</th>
<th>V8</th>
<th>1-4-2-5-3-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Hand</td>
<td>V8</td>
<td>1-2-7-3-6-8-4-5</td>
<td></td>
</tr>
</tbody>
</table>

2. Adjust the injector plunger and then the crossheads and valves of the first cylinder as explained in succeeding paragraphs. Turn the crankshaft in the direction of rotation to the next "VS" mark.

3. Continue turning the crankshaft in the direction of rotation and making adjustments until all injectors and valves have been correctly adjusted.

**Note:** Two complete revolutions of the crankshaft are
needed to set all injector plungers and valves. Injector and valves can be adjusted for only one cylinder at any one " VS" setting.

**Adjust Injectors, Crossheads and Valves**

It is essential that the injectors, on any cylinder, be set prior to setting the valve clearances on the same cylinder. Setting the injector deflects the shaft slightly which affects the valve clearances.

**Injector Plunger Adjustment**

Before adjusting the injector tighten the injector hold-down capscrew to 30 to 35 ft-lb [41 to 47 N·m].

The injector plungers of all engines must be adjusted with an inch-pound torque wrench to a definite torque setting. Snap-on Model TQ12B or equivalent torque wrench and a screwdriver adapter can be used for this adjustment, Fig. 14-61.

[Image: Fig. 14-61, (V114115A). Adjust injector plunger.]

1. Turn the adjusting screw down until the plunger contacts the cup. Advance an additional 15 degrees to squeeze the oil from the cup.

2. Loosen the adjusting screw one turn. Use a torque wrench calibrated in inch-pounds and a screwdriver adapter to tighten the adjusting screw 60 in-lb [68 N·m] torque.

**Note:** After all the injectors and valves are adjusted, and the engine has been started and warmed up to 140°F [60°C] oil temperature, reset the injectors.

3. Hold the injector adjusting screw and tighten the injector adjusting screw locknut 40 to 45 ft-lb [54 to 61 N·m] or 30 to 35 ft-lb [41 to 47 N·m] torque when using ST-669 Adapter.

**Crosshead Adjustments**

If the crossheads were not adjusted during assembly adjust the crosshead as follows:

1. Loosen the valve crosshead adjusting screw locknut and back off the screw one turn.

2. Hold the crosshead firmly down on the mating valve stem. Run the crosshead adjusting screw down until it touches the valve stem. Hold the adjusting screw in this position and tighten the locknut.

3. Tighten adjusting screw locknut 25 to 28 ft-lb [34 to 38 N·m]. When ST-669 Torque Wrench Adapter is used, tighten nuts 22 to 26 ft-lb [30 to 35 N·m].

**Valve Adjustment**

The same crankshaft position used in adjusting the injectors is used for setting the intake and exhaust valves.

1. Loosen the locknut and back off the adjusting screw. Insert the feeler gauge between the rocker lever and the top of the crosshead. Valve clearances are shown in Table 14-5. Turn the screw down until the lever just touches the gauge and lock the adjusting screw in this position with the locknut, Fig. 14-62.

[Image: Fig. 14-62, (V1141182). Adjust valves.]

**Table 14-5: Valve Adjustment (All Models)**

<table>
<thead>
<tr>
<th>Oil Temperature</th>
<th>Valve Clearance Intake</th>
<th>Exhaust</th>
</tr>
</thead>
<tbody>
<tr>
<td>70°F [21°C]</td>
<td>0.012 [0.30]</td>
<td>0.022 [0.56]</td>
</tr>
<tr>
<td>140°F [60°C]</td>
<td>0.010 [0.25]</td>
<td>0.020 [0.51]</td>
</tr>
</tbody>
</table>
2. Tighten the locknut to 40 to 45 ft-lb [54 to 61 N·m] with a torque wrench. Tighten to 30 to 35 ft-lb [41 to 47 N·m] when using ST-669 Adapter.

3. Always make the final valve adjustment after the injectors are adjusted and with the engine at operating temperature.

**Cylinder Head Cover**

1. After all injectors, valves, and crossheads have been adjusted, install the valve covers to the heads with new gaskets.

2. Tighten the capscrews 30 to 35 ft-lb [41 to 47 N·m].

**Remove Engine from 3375193 Engine Stand**

1. Attach an ST-1258 Lifting Fixture and suitable hoist to engine.

2. Remove the engine from the stand. Set the engine on ST-163 Engine Supports.

**Caution:** Binding of the capscrews when lifting engine may crack the block. Care must be taken when removing the engine from the stand.

**Left Bank Water Header Cover Plate**

1. Secure the water header cover plate with a new gasket to the cylinder block.

2. Start with the two center capscrews, and working to both ends, tighten the capscrews alternately 30 to 35 ft-lb [41 to 47 N·m] torque.

3. Install the air compressor water inlet and outlet lines. Before installation check the condition of the rubber sealing washers. Lubricate the rubber washer with petroleum jelly to insure a proper seal when tightening.

**Exhaust Manifolds**

1. Position the exhaust manifold with new gaskets to each cylinder head. Position the gaskets with the word “OUT” next to the exhaust manifolds.

2. Install the capscrews, spacers and lockplates. Coat the capscrew threads with anti-seize compound to prevent “thread damage”.

3. Tighten the capscrews 30 to 32 ft-lb [41 to 43 N·m] in 15 ft-lb [20 N·m] increments.

4. Bend the lockplates up over the head of each capscrew, Fig. 14-63.

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**Fig. 14-63.** (V114183A). Bend lock plates.

**Turbocharger and Connections**

1. Install the (2) turbocharger support brackets on the right bank intake manifold. Leave the brackets slightly loose for alignment, Fig. 14-64.

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**Fig. 14-64.** (V114189). Install turbocharger support brackets.

2. Install the exhaust collector flange to the support brackets, Fig. 14-65. Use an anti-seize compound on the capscrews. Do not tighten the capscrews until the exhaust system is aligned.

3. Install the turbocharger to the exhaust collector flange and intake manifold crossover, (1) Fig. 14-66.

**Note:** If the turbocharger “V” band clamp must be loosened to align turbocharger, torque the “V” band clamp nut to 32 to 36 in-lb [3.6 to 4.0 N·m].

Secure the turbocharger to the exhaust collector