

Automotive Engines 10th

Chapter 29 Pistons, Rings, and Connecting Rods

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1. List the steps needed to recondition connecting rods.
2. What are the methods used to control piston heat expansion?
3. What causes the piston ring groove clearance to widen in service?
4. Why are forged pistons recommended for use in high-performance engines?
5. Why are some piston skirts tin plated?
6. How is the piston pin installed in the piston and rod assembly?
7. How does piston pin offset control piston slap?

Answer Key

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1. Connecting rods are reconditioned by removing metal from both the rod large end and rod cap and then re-machining the large end bore. Twisted connecting rods can often be straightened.
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2. Piston heat expansion is controlled by designing in expansion slots or heat dams. Most pistons are cam ground that results in the piston becoming nearly round at operating temperatures. Steel strut inserts are also used that are designed to control the amount of heat expansion from cold to normal operating temperatures.
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3. As the piston rapidly travels up and down, it tosses the ring from the top to the bottom of the ring groove, thus widening the groove over time. Ring flexing and twisting also cause ring groove widening.
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4. Forged pistons are stronger than cast pistons and they conduct heat more efficiently. Forged pistons operate about 20% cooler than cast pistons. Critical piston crown temperatures are cooler with forged pistons.
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5. Some pistons are tin plated to help reduce scuffing and scoring during periods of minimum lubrication.
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6. Non-floating piston pins are installed into a piston and rod by first heating the small end of the connecting rod. Before the rod has a chance to cool, the piston pin is pushed into the piston and rod. As the rod cools, an interference fit is created between the piston pin and the connecting rod. Floating piston pins are retained with lock rings.
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7. Piston pin holes are offset toward the major thrust side of the piston causing the piston to rock over to the opposite side of the cylinder wall when changing from traveling up to down, thus reducing piston slap.
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