

Automotive Engines 10th

Chapter 31 Crankshafts, Balance Shafts, and Bearings

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

1. Why is it important that crankshafts be stored vertically?
2. What are the two types of camshaft bearings?
3. What are the types of engine bearing materials?
4. What is the difference between bearing crush and bearing spread?
5. What is the difference between primary and secondary balance?

6. How many degrees of crankshaft rotation are there between cylinder firings on an inline 4-cylinder engine, an inline 6-cylinder engine, and a V-8 engine?

Answer Key

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1. All crankshafts should be stored vertically to help prevent warping due to gravity.
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2. Full round (sleeve-type) bearings
Split-type (half-shell) bearings
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3. Engine bearings materials include: babbett, tri-metal, and aluminum.
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4. Bearing crush is the amount the bearing insert extends above the housing bore. Bearing spread is the arc of the bearing insert; it has a slightly larger arc than does the bearing housing.
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5. • Primary balance. When pistons move up and down in the cylinders, they create a primary vibration, which is a strong low-frequency vibration. A counterweight on the crankshaft opposite the piston/rod assembly helps reduce this vibration. An inline four-cylinder engine has very little primary vibration, because as two pistons are traveling upward in the cylinders, two are moving downward at the same time, effectively canceling out primary unbalances.
 - Secondary balance. Four-cylinder engines, however, suffer from a vibration at twice engine speed. This is called a secondary vibration, which is a weak high-frequency vibration caused by a slight difference in the inertia of the pistons at top dead center, compared to bottom dead center. This vibration is most noticeable at high engine speeds, especially if the engine size is greater than 2 liters.
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6. The number of degrees of crankshaft rotation between cylinder firings is 180° for an inline four, 120° for an even fire V-6 or inline 6-cylinder engine, and 90° for a V-8.
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