

*Automotive Engines 10th*

**Chapter 20 Turbocharging and Supercharging**

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

1. How does the bypass valve work on a supercharged engine?
2. What are the advantages and disadvantages of supercharging?
3. What turbocharger control valves are needed for proper engine operation?
4. What are the reasons why supercharging increases engine power?
5. What are the advantages and disadvantages of turbocharging?

## Answer Key

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1. A bypass valve is used on many superchargers to allow intake air to flow directly into the intake manifold bypassing the supercharger. This bypass valve improves fuel economy under part-throttle conditions, where the boost from the supercharger is not needed.  
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2. A supercharger is able to boost engine power at all engine speeds and loads without a delay or lag. However, the supercharger itself takes power from the engine to operate, thereby reducing its efficiency.  
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3. A typical turbocharger system uses a wastegate to control (limit) the maximum boost, as well as a relief valve, such as a compression bypass valve or blow-off valve to release pressure in the intake system when the throttle is closed.  
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4. Superchargers increase engine power by increasing the air-fuel charge density, resulting in a more powerful combustion in the cylinder.  
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5. A turbocharger is more efficient than a supercharger because it uses the waste heat energy in the exhaust to provide boost. However, there is a delay or lag from the time the driver depresses the accelerator and when boost occurs.  
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