

Technology Forecast

Fewer Valves Produce Better Performance

Much has been written in recent years about engines with four—and even five—valves per cylinder. Popular opinion often ties this greater number of valves to a higher level of technology and performance. That thinking isn't necessarily correct. Automotive engineers have learned that while more is sometimes better, it also can be too much.

For that reason, engineers are studying the possibility of using cylinder heads with only three valves per cylinder. These multi-valve systems could take the place of engines with four or five valves per cylinder.

This new setup is attractive because it produces strong airflow into the combustion chamber and is less complex to manufacture. It also has fewer sharp edges that can trap carbon deposits. Carbon deposits may not allow the valve to seat properly.

Cylinder heads with three valves also promise to be more environmentally friendly. As the piston comes up on the compression stroke, a swirl effect of the air-fuel mixture is created. This motion allows a leaner air-fuel mixture to be ignited inside the cylinder. With less fuel being consumed, fewer greenhouse gases—notably carbon dioxide (CO₂)—are created. An added benefit is that this system improves fuel economy.

Action Activity

Use the Internet and other sources to find out more about changes in cylinder and valve designs. Create a past-present-future timeline that identifies key design changes over time. Label each decade (for example, 1930s) and design feature (for example, four cylinder OH cam). Add illustrations of vehicles and engine components.