

What causes sludge?

Industry experts say some modern engines are more prone to sludge than older engines. Here are the top four reasons.

1. Engine breathing

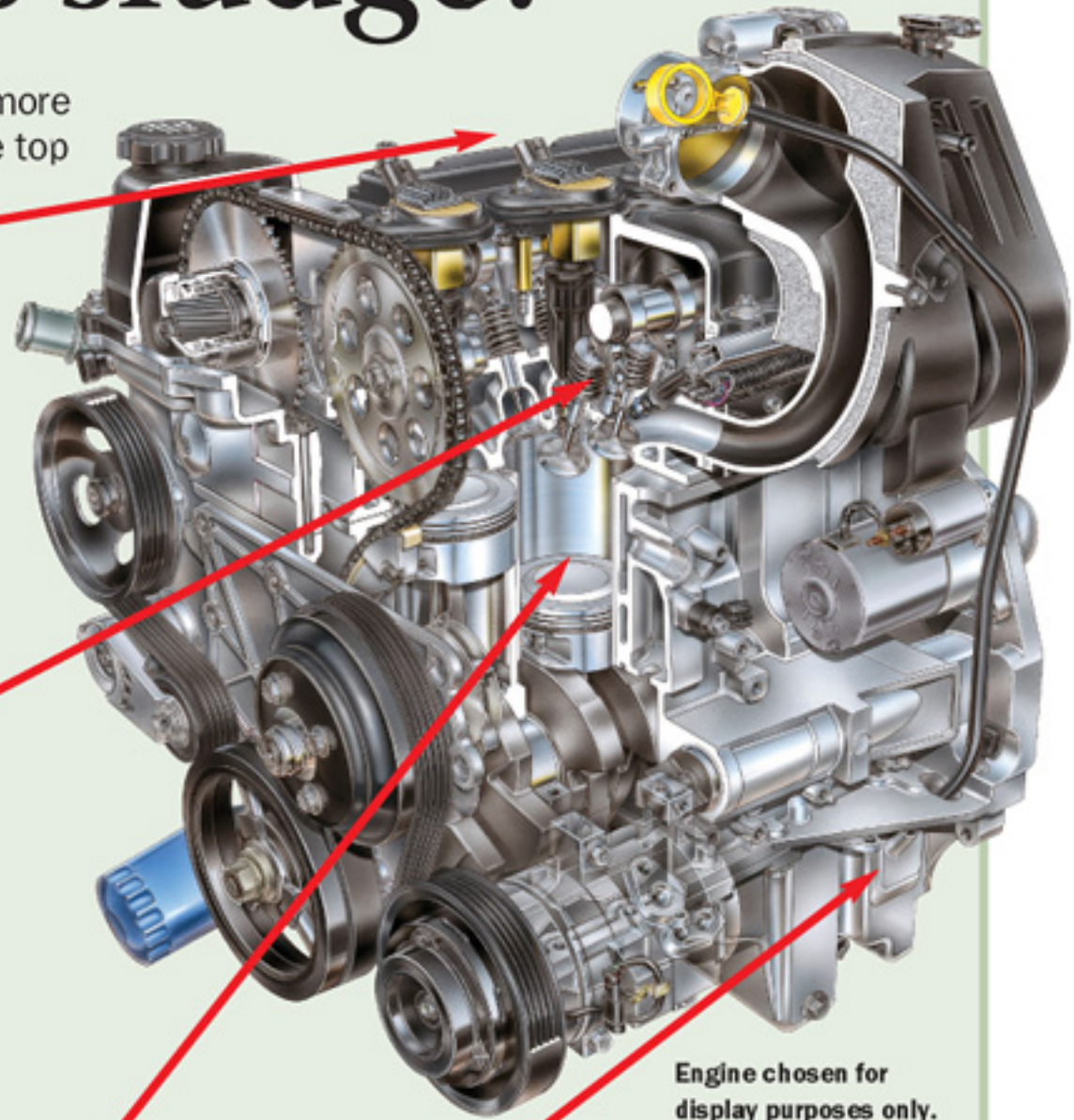
Oil vapor and combustion gases that develop inside an engine must be purged, usually by burning in the cylinders. If the gases and oil vapor are not disposed of, sludge can form. Toyota will not say what causes sludge in some of its V-6 and four-cylinder engines, but after the problem emerged, the company changed the baffles under the valve cover, part of the engines' breathing systems.

2. Hot and cold spots

To warm engines quickly and reduce emissions, engineers in recent years have moved the catalytic converter closer to the cylinder head. In some cars, the converter has been integrated into the exhaust manifold. Both scenarios bring a major heat source closer to the engine, causing hot and cold spots. The temperature difference between the cylinder head and block shouldn't vary by more than 15 degrees Fahrenheit, General Motors says. Hot spots bake oil, causing sludge. Cold spots cause acid and sludge.

3. Tighter tolerances

Engines now burn less oil because more accurate machining has created an extremely tight fit between the engine's moving parts, such as piston rings, bearings and valves. The result: low oil lights don't flash, and customers neglect oil changes.



Engine chosen for display purposes only.

4. Poor maintenance

Toyota, Volkswagen and the Chrysler group say sludge is caused by drivers who miss recommended oil changes. There may be some truth to that, especially with leased vehicles. Also, many drivers who live in dusty or other severe environments don't change their oil more frequently, as recommended by most manufacturers.

– Richard Truett