Automakers and consumers alike want more octane, with automakers continuing to favor turbocharged, higher-compression engines in which the use of high-octane gasoline is recommended or required. And this is the sort of marketplace that demands ethanol as a clean, affordable source of octane—a need that will only intensify as automakers contend with more stringent fuel economy requirements moving forward.

Ethanol’s blending octane rating of 114 is significantly higher than the ratings of the main petroleum-based octave components. Moreover, aromatic hydrocarbons such as benzene and toluene may raise octane, but they worsen air pollution and are highly toxic.

Refiners have largely optimized their processes to take advantage of ethanol’s properties. Today, most regular gasoline in the United States is produced using blendstock with an octane rating of 84, which is then upgraded to a rating of 87 by adding 10 percent ethanol. Refiners may continue to reduce the octane rating of the gasoline blendstock to 82 or 83 as E15 becomes more ubiquitous. This allows refiners to increase throughput of hydrocarbon blendstock at a lower cost.

Demand for sources of octane is expected to continue to grow, driven by the utilization of advanced vehicle engines, tighter gasoline specifications, and the expansion of E15. It could be propelled further by policies that compel the use of midlevel ethanol blends such as E25 or E30 to meet future fuel economy and emissions standards. RFA continues to push for an expanded future role for high-octane, low-carbon ethanol and educate policymakers about the benefits of such fuels—especially as ethanol moves toward net-zero emissions.

**What is octane?**

A fuel’s OCTANE RATING is the measure of its ability to resist “knocking” in the engine, which is caused when the air/fuel mixture detonates prematurely during combustion. According to the U.S. Department of Energy, “Using a lower octane fuel than required can cause the engine to run poorly and can damage the engine and emissions control system over time. It may also void your warranty.”
What is Octane and Why is it Important?

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**BLENDING OCTANE RATINGS OF VARIOUS GASOLINE BOOSTERS**

High-Octane Legislation

Introduced in the last congressional session and expected to be reintroduced this year, the Next Generation Fuels Act would establish a certification test fuel with a research octane number (RON) of 98, along with a requirement that the source of the octane boost reduces lifecycle greenhouse gas emissions by an average of at least 30% compared to a 2018 gasoline baseline. RFA first began advocating for the creation of a national high-octane low carbon fuel standard in late 2018.