

# News Release



Contact:

Lauren Daniel

Cummins Inc.

Phone: 317-995-3972

Email: [lauren.daniel@cummins.com](mailto:lauren.daniel@cummins.com)

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## **Cummins and Oak Ridge National Laboratory develop novel steel alloy resulting in significant engine improvements**

**COLUMBUS, INDIANA** – Today global power and technology leader Cummins Inc. (NYSE:CMI) announced the development of a new high temperature steel alloy in collaboration with Oak Ridge National Laboratory (ORNL). The new material will increase the durability and ultimate efficiency of Cummins' engines and better serve the company's customers and fleets.

As a leading manufacturer in the engine and power markets, Cummins continues to discover ways to improve performance, capability and durability within its products. Since starting its alliance with ORNL in 2018, the project to research and develop an alternative steel alloy with significantly improved high temperature oxidation resistance and strength, while maintaining affordability, has provided quick and effective results.

"The partnership with Oak Ridge National Laboratory and development of the new material shows the serious potential for improvements and efficiencies for our engines," said Corey Trobaugh, Cummins Director- Applied Science and Technology. "I am extremely proud of the value of work our team has provided and the future improvement it lends."

Previous materials have limited engine efficiency gains and emissions reductions, and prohibited engineers from extracting more heat from the combustion process, due to materials degrading prematurely from oxidation, scaling, and cracking.

The new material is significantly stronger at elevated temperatures, compared to the most commonly used commercial steel, 4140, and has virtually eliminated those degradation pathways. When comparing the new alloy to 4140 steel, the novel steel alloy exhibited 85% greater Ultimate Tensile Strength (maximum stress a material can withstand while being stretched or pulled before breaking) and 143% greater fatigue strength (maximum cyclical stress that can be applied for the material to withstand at least 10 million cycles before failure) at 600 °C. Additionally, in an aggressive, long-term engine test of pistons manufactured from the new material, no cracking occurred and very little oxidation or scaling occurred. The new medium carbon steel offers at least a 50°C increase in temperature capability as compared to current 4140 steels. Cooperative development of the new alloy was supported by the Department of Energy's Vehicle Technologies Office LightMAT Program.

With innovation at the forefront, Cummins continues to innovate across its entire portfolio of power solutions to help better serve its customers and promote a more sustainable future.

### **About Cummins Inc.**

Cummins Inc., a global power technology leader, is a corporation of complementary business segments that design, manufacture, distribute and service a broad portfolio of power solutions. The company's products range from internal combustion, electric and hybrid integrated power solutions to components including filtration, aftertreatment, turbochargers, fuel systems, controls systems, air handling systems, automated transmissions, electric power generation systems, microgrid controls, batteries, electrolyzers and fuel cell products. Headquartered in Columbus, Indiana (U.S.), since its founding in 1919, Cummins employs approximately 73,600 people committed to powering a more prosperous world through three global corporate responsibility priorities critical to healthy communities: education, environment and equality of opportunity. Cummins serves its customers online, through a network of company-owned and independent distributor locations, and through thousands of dealer locations worldwide and earned about \$2.2 billion on sales of \$28.1 billion in 2022. Learn more at [cummins.com](https://www.cummins.com).