



TECHNOLOGY

Ultra Low Emission Colorless Distributed Combustor

OVERVIEW

Background

Engines currently utilize the injection of fuel and oxidant into the combustion chamber in diffusion or premixed mode to transform the chemical energy of fuel into thermal energy. Using available methods, which rely on the Colorless Distributed Combustor (CDC), engine manufacturers face challenges of combustion instability, emissions, durability, noise, and significant temperature variations that decrease combustor life.

A researcher at the University of Maryland has modified the CDC to emit vastly lower levels of nitrous oxide, carbon monoxide, carbon dioxide, and noise. A novel process of enthalpy exchange and fuel mixture preparation has been developed for use in the CDC. The modified technique achieves a uniform temperature profile along the combustor centerline and negligible emissions without using any pollution control device or expensive catalyst. Testing demonstrates a significant reduction in energy consumption (hence a reduction in CO₂ emission), a compact combustor with reduced equipment size, ultra low noise emission, and a significant reduction of pollutants including NO_x, CO, and unburned hydrocarbons. This improved CDC technique has numerous applications, including industrial gas-turbine combustion, utilization of low grade waste fuels, and land-based gas turbines with long-term development applications for aircraft gas-turbine engines. A patent application is pending.

Advantages

- More energy efficient than existing techniques
- Environmentally friendly, emitting lower levels of NO, CO₂, CO, and noise
- Superior pattern factor from a uniform thermal field distribution

Applications

- Land-based gas turbines
- Effective utilization of low-grade waste fuels
- Aircraft gas turbine engines

For additional information, please contact the Office of Technology Commercialization, University of Maryland College Park, via e-mail at otc@umd.edu or phone at 301-405-3947.

CONTACT INFO

UM Ventures
0134 Lee Building
7809 Regents Drive
College Park, MD 20742
Email: umdtechtransfer@umd.edu
Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

Contact OTC for licensing information

CATEGORIES

- Clean Technology
- Engineering
- Aerospace
- Industrial Processing

EXTERNAL RESOURCES

- [US Patent 8,695,350](#)
- [US Patent 9,459,009](#)

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