Achates Power and AVL Selected to Develop Next-Generation Combat Engine

The U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC) recently selected Achates Power and AVL Powertrain Engineering, Inc. to build the Next-Generation Combat Engine. The contract, worth a total of $4.9 million, is for the design and construction of an engine for U.S. combat and tactical vehicles that provides:

- Superior fuel efficiency
- Low heat rejection
- Multi-fuel capabilities

To meet the program requirements, Achates Power and AVL proposed an engine design based on the Achates Power opposed-piston, two-stroke technology. The Achates Power engine—which has already demonstrated 20 percent lower cycle average brake-specific fuel consumption when compared to leading, conventional diesels—recently exceeded 3,600 hours of dynamometer testing and achieved 47.5 percent brake thermal efficiency.

"These results validate the engine’s technical merit and are the reason that we chose to work with Achates Power on this program," said Don Manvel, Chairman, AVL Americas.

Read more.

Recent Achates Power Performance and Emissions Results

Earlier this year, Achates Power began dynamometer testing on its all new 1.6L single-cylinder, opposed-piston engine. The design and test results were the focus of a technical paper.
presented last month in Nuremberg, Germany at the 7th MTZ Conference on Heavy-Duty, On- and Off-Highway Engines. In addition to highlighting the design attributes that optimize the engine’s performance--two-stroke operation, opposed-piston architecture, advantageous stroke-to-bore ratio, three-cylinder configuration and a patented combustion system--the paper features recent dynamometer results. Read more.

Two-Stroke Engines: Opposed-Piston vs. Conventional

In a 2011 technical paper, Achates Power demonstrated the thermal efficiency benefits of an opposed-piston, two-stroke (OP2S) engine compared to a conventional, four-stroke (4S) engine. But, what happens when you compare our opposed-piston, two-stroke (2S) engine to a conventional 2S engine? That was the focus of an Achates Power presentation given at the recent Directions in Engine-Efficiency and Emissions Research (DEER) Conference. The presentation provided a comparative analysis of gas exchange, flow areas and closed-cycle thermodynamics of loop-scavenged and uniflow-scavenged two-stroke engines versus the Achates Power OP2S. The conclusion: the Achates Power OP2S provides brake thermal efficiency advantages not possible with conventional two-stroke engines. Learn more.

Enhancing Engine Durability

Today, million-mile durability is the expectation of commercial vehicle owners. This requires engine developers to invest significant resources in durability analyses, before ever putting a new engine into production. At Achates Power, we use advanced modeling and simulation tools to both evaluate and enhance the durability of our opposed-piston engine. Watch the video or read the blog.

"Under the Hood" Heat Transfer Advantage of Opposed-Piston Engines
By Dr. Gerhard Regner  
Director, Applications Engineering  
Achates Power, Inc.

To maximize engine efficiency one must minimize losses. Heat transfer to the cylinder head, cylinder wall and piston crown is a large source of heat loss in engines. Cooling systems keep these engine components from overheating, but all that heat being carried away by the cooling system is lost energy. Many factors contribute to the heat transfer—and energy loss—of an engine, but a major one is the ratio of the surface area of the combustion chamber to the volume of the combustion chamber during combustion. The Achates Power OP2S design minimizes the surface area-to-volume ratio and, thereby, maximizes efficiency. Read more.

In the News

- An Engine in Opposition to Convention  
  (The Virtual Driver)
- Amazing Engines Promise 60 to 100 MPG  
  (Mother Nature Network)

Upcoming Events

- **SIAT 2013**  
  Pune, India - January 10, 2013, beginning at 11 a.m.  
  **Presentation:** Modernizing the Opposed-Piston, Two-Stroke Diesel Engine for Clean, Efficient Transportation

- **SAE World Congress**  
  Detroit, MI - April 17, 2013 at 1:30 p.m. in the Cobo Center  
  **Presentation:** AVL Technology Leadership Center  
  Panel: Advanced Propulsion - What Are the New and Innovative Technologies That Will Be the "Game Changers"?

If you weren’t able to attend the Achates Power presentations this fall, read our blog for more information on our participation in CALSTART’s U.S.-China Clean Truck and Bus Summit and the 7th MTZ Conference.