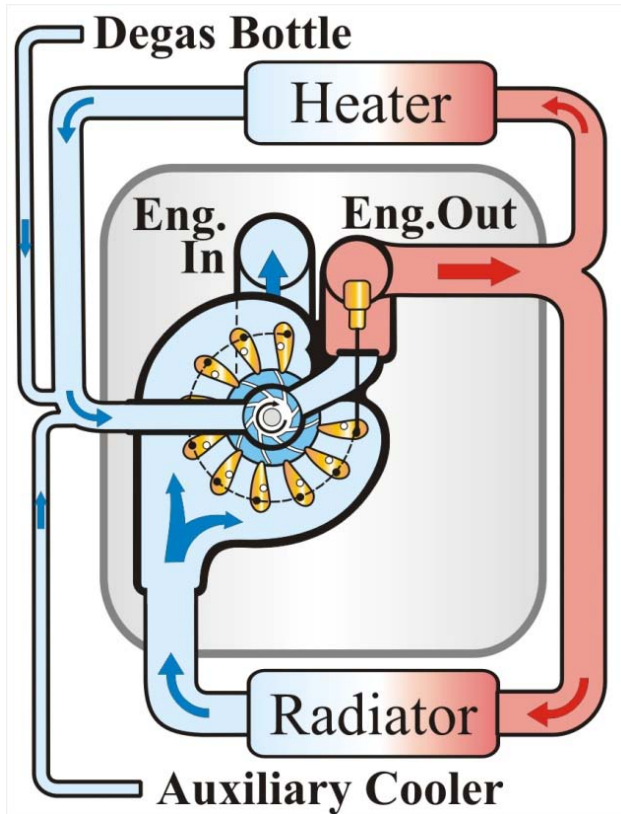
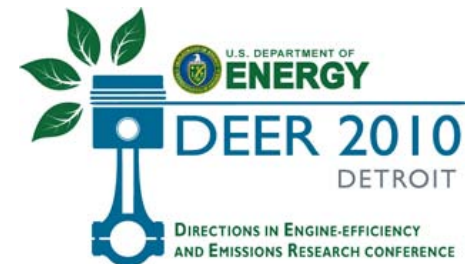


Efficient Thermally Variable Cooling System



Poster Location P-07

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Fuel Saving - Thermal Management System

Opportunity, Legacy Cooling Systems:

- employ relatively inefficient radial/centrifugal pumps
- with relatively restrictive thermostats & housings
- develop flow and pressure linked to engine speed
- are prone to under- and over-cooling inefficiencies

Solution, Efficient Thermal Management:

- reduces pumping parasitic power by ~ **85%**
- flow and pressure corresponding to thermal load
- integrates coolant flow control functionality
- improves system durability

Test Results from 1st Prototype:

- **Reduced Fuel Consumption:** **1.2 %**
(up to 2% savings predicted upon optimization)
- **Reduced Emissions:**
 - Total Hydrocarbons:** **8.4 %**
 - Carbon Monoxide:** **23.4 %**
 - Nitrogen Oxides:** **6.3 %**

Test Conditions: US EPA FTP 75

Performance & Efficiency Characteristics

