EVANS®
Waterless Coolants

Overview

Evans Cooling Systems, Inc. of Sharon, CT, has a patented technology achieving significant fuel economy improvement for heavy duty diesel engines (refer to page 3 ROI example). Evans' uniqueness is that it's the ***only waterless*** engine coolant available, providing superior benefits that are unobtainable with traditional water-based coolants. Reducing fuel consumption, decreasing emissions, and contributing to a cleaner environment are all achievable with Evans Heavy Duty Thermal Coolant (HDTC).

The Technology

Evans Waterless Heavy Duty Thermal Coolant (HDTC):

- *A blend of glycols and additives that do not require water for solubility.*
- *Boiling point: **375° F**, pour point: **<-40° F.***
- *Huge separation between operating temperature and coolant boiling point.*
- *Low conductivity – no "battery effect".*
- *HDTC is a lifetime coolant if it does not become contaminated with water.*
- *Additives don't drop-out and the coolant has a 10-year shelf storage life.*
- *Reduced toxicity*

Primary Benefits

- **Improved Fuel Economy** – *measured savings up to 8%*
- **Reduced Maintenance** – *no SCAs, no coolant changeout, low pressure, no cavitation erosion*
- **Lifetime Coolant** – *eliminates replacement and future disposal issues*
- **Environmentally Friendly** – *reduced toxicity*

Any singular benefit above can be reason to use Evans HDTC, and most applications will have the advantage of all benefits. Heavy duty vehicles, particularly those which spend more time idling such as waste removal trucks, are the biggest beneficiaries with fuel savings more towards **8%**.

Applications

Evans Coolant offers massive potential as any liquid cooled engine can be retrofitted with Evans coolants. Evans technology delivers immediate advantages to the following applications:

- High ambient temperature applications (e.g. generators in Iraq)
- High altitude applications (e.g. construction equipment at 16,000 ft in Qinghai, China)
- Military vehicles (e.g. Humvees with protected radiators)
- Heavy duty diesel trucks and buses
- Automobiles and Light duty trucks
- Marine
- Fork lift and tow motor applications
- Construction / Agricultural / Waste and Landfill equipment
- Racing / Motorcycle / Antique cars / high performance and other motorsports applications
- Stationary engines / generators
- Aircraft (e.g. military UAVs)
- Solar and Geothermal applications
- Specialty cooling requirements for electronics and machine tools

Testing Summary

Recent Fuel Testing Programs

- **PAVE** (Program for Advanced Vehicle Evaluation) at Auburn University showed fuel savings of **3.04%.**
- **PVTA** (Pioneer Valley Transit Authority) buses showed fuel economy improvement of over **6%.**
- **USA Hauling** fuel economy testing of Class 8 trucks, yielded an average increase in fuel economy of **7.2%.**
- **Veolia** (waste vehicles in Sheboygan WI) showed improved fuel economy of **4.92% - 6.73%.**

Product Tests

Evans HDTC has undergone a series of testing with ASTM, Clarke Labs, Amalgatech, for virtually all aspects of product specifications, with exceptional results.

D6210-08, the ASTM Standard Specification for Fully-Formulated Glycol Base Engine Coolant for Heavy-Duty Engines.

1. Evans waterless Heavy Duty Thermal Coolant (HDTC) differs from D6210 in these respects:

    a. D6210 covers coolants that are water-based. HDTC is waterless.
    b. The coolants governed by D6210 are single-glycol formulations. HDTC contains a blend of glycols.

2. HDTC passes all of the physical, chemical and performance requirements of Specification D3306 that are pertinent to waterless formulations, e.g. D1120.

3. HDTC passes the performance requirements of D3306 with regard to D1384 when water is not added and air is not bubbled.

4. HDTC passes the following ASTM tests, all of which are appropriate for waterless coolants:

    a. D97 Standard Test Method for Pour Point of Petroleum Products. Evans HDTC waterless coolant exhibits a pour point below -40C.
    b. D445 Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids. Evans HDTC waterless coolant tests with a viscosity at -20C that is less than 400 cSt.
    c. D1123 Standard Test Methods for Water in Engine Coolant Concentrate by the Karl Fischer Reagent Method. The water content of Evans HDTC waterless coolant tests at less than 0.5 percent.

The toughest corrosion problem in a heavy duty engine is cavitation erosion of the cylinder liners. The ASTM, after many years of effort, has found a test method that can predict the future likelihood of cylinder liner cavitation erosion. Southwest Research Institute, working with the ASTM D-15 Committee (Engine Coolants) has tested dozens of engine coolants, all of them water-based except for the fluid submitted by Evans. Evans performed over 70% better than any other coolant tested in preventing cavitation erosion. It is now approved as an ASTM standard test method.

Estimated Return on Investment

Class 8 Tractors

Per vehicle cost / benefit analysis (example):

Coolant Cost:	$412	(12 gallons $34.36 each)
Labor Cost:	$150	(6 hours labor $25.00 per hour)
Thermostat Cost:	$50	
Resistor Pac:	$25	
Total Cost:	**$1,581**	

3% Fuel Savings: $1,581

(5.5 mpg, 100,000 miles driven, $2.90 / gallon of diesel: 18,181 gallons = $52,717 total fuel cost)

ROI: 5 Months

Extended savings for a fleet of 500 vehicles:

Conversion Cost: $318,500
Annual Fuel Savings: $790,500

First Year Savings: $472,000
Subsequent Annual Savings: $790,500

Vocational Vehicles

(i.e. Refuse Trucks)

Per vehicle cost / benefit analysis:

Coolant Cost:	$412	(12 gallons $34.36 each)
Labor Cost:	$150	(6 hours labor $25.00 per hour)
Thermostat Cost:	$50	
Resistor Pac:	$25	
Total Cost:	**$637**	

4% Fuel Savings: $870

(4 mpg, 30,000 miles driven, $2.90 / gallon of diesel: 7,500 gallons = $21,750 total fuel cost)

ROI: 9 Months

Extended savings for a fleet of 500 vehicles:

Conversion Cost: $318,500
Annual Fuel Savings: $435,000

First Year Savings: $116,500
Subsequent Annual Savings: $435,000