

Educating Consumers: *New Content on Diesel Vehicles, Diesel Exhaust Fluid, and Selective Catalytic Reduction Technologies on the AFDC*

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National Renewable Energy Laboratory

DEER Conference

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What is the AFDC?

Alternative Fuels and Advanced Vehicles Data Center (AFDC)

- Technology-focused Web site
- Comprehensive alternative fuels and advanced vehicle information
- Tools for the general public, fleets, educators, and consumers
 - Alternative Fueling Station Locator
 - Vehicle Search (alternative fuel and advanced)
 - Cost/Emissions Calculators
 - Laws and Incentives
 - Publications Database
 - Truck Stop Electrification Site Locator
- Sponsored by Clean Cities, part of DOE's Vehicle Technologies Program

AFDC: www.eere.energy.gov/afdc



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The Alternative Fuels and Advanced Vehicles Data Center (AFDC, formerly known as the Alternative Fuels Data Center) provides a wide range of information and resources to enable the use of alternative fuels (as defined by the [Energy Policy Act of 1992](#)), in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction, and fuel economy.

This site is sponsored by the U.S. Department of Energy's [Clean Cities](#) initiative.



Data, Analysis, and Trends

Our [Data, Analysis, and Trends](#) section provides industry trends and facts based on data analysis.



Alternative Fuel Portals

- [Biodiesel](#)
- [Electricity](#)
- [Ethanol](#)
- [Hydrogen](#)
- [Natural Gas](#)
- [Propane](#)

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Select Vehicle Information

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Quick Links to AFDC Tools

- [Vehicle Make & Model Search](#)
- [Alternative Fueling Station Locator](#)
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Handbook for Handling, Storing, and Dispensing E85

(PDF 5.4 MB)
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Why Diesel Information?

- Light-duty diesels are ready to enter the marketplace
- Fuel-efficiency improvements to light-duty diesels lead to reduced dependence on foreign oil
- Some light- and heavy-duty vehicles will require diesel exhaust fluid (DEF), and consumers need to be trained on how to use it
- Consumers are used to using the AFDC for alternative fuels and advanced vehicle information
- Adding DEF information to the AFDC is a cooperative effort between:
 - U.S. Department of Energy
 - National Renewable Energy Laboratory
 - Alliance of Automobile Manufacturers

Diesel Information on the AFDC

- Content is located in the Diesel Vehicles section and includes links to relevant information
- All vehicle classes are covered (light-, medium-, and heavy-duty)
- Topics covered on the site include:
 - Light-duty vehicle availability
 - Emissions
 - Selective catalytic reduction
 - DEF
 - NO_x traps

Diesel Vehicles Section



Alternative Fuels & Advanced Vehicles Data Center

Alternative & Advanced Vehicles



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Diesel Vehicles

Advanced diesel vehicles using EPA-mandated [ultra-low sulfur diesel](#) (ULSD) fuel are among the most fuel-efficient vehicles available today. Collaborative R&D between DOE, industry and the national laboratories has resulted in improved engine efficiency and very low emissions. Collaboration with the U.S. Environmental Protection Agency, industry, and national laboratories under the DOE Diesel Emission Control Sulfur Effects (DECSE) program provided the supporting data needed to mandate 15 ppm sulfur in diesel fuel as the appropriate level to maintain effectiveness of diesel engine emission control technologies. Most diesel vehicles also can run on [biodiesel](#) blends without engine modification.

Progress in DOE- and industry-funded diesel engine R&D is highlighted annually in the [Advanced Combustion Engines Progress Report](#) and in the [DOE Diesel Engine-Efficiency and Emissions Research \(DEER\) Conference](#), now in its 14th year.

This page serves as a table of contents for the Diesel Vehicles section. To learn more, choose from the links below.

[Diesel Vehicle Classes](#)

Learn about light-, medium-, and heavy-duty diesel vehicles.

[Light-Duty Diesel Vehicle Availability](#)

Find out which light-duty diesel vehicles are available in the United States.

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Light-Duty Diesel Vehicle Availability



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Light-Duty Diesel Vehicle Availability

According to [I.D. Power Automotive Forecasting](#), demand for light-duty diesel vehicles might approximately double in the next 10 years. More auto manufacturers will be producing light-duty diesels, and these vehicles will be more fuel efficient and environmentally friendly than ever.

To learn about currently available light-duty diesel vehicles, use the [FuelEconomy.gov's diesel vehicle search engine](#) or visit the Diesel Technology Forum's [Diesels for Sale in the U.S.](#) (this page lists some larger diesel vehicles as well.)



FuelEconomy.gov

www.fueleconomy.gov

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 [Gas Mileage Tips](#) |
 [Gasoline Prices](#) |
 [Your MPG Will Vary](#) |
 [Why is Fuel Economy Important?](#) |
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Hybrid Vehicles

Diesel Vehicles & Fuels

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Energy Requirements

[Energy Efficient Technologies](#)

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Fuel Cell Vehicles

2009 Diesel Vehicles					
Sorted by MPG (city). Click on column headings to resort					
Select up to 4 models to compare					
Model	New EPA MPG city	Annual Fuel Cost	Carbon Footprint (tons/yr of CO ₂)	Air Pollution Score	
<input type="checkbox"/> Volkswagen Jetta 4 cyl, 2 L, Manual 6-spd, Diesel	 30 city 41 hwy	\$2029	6.2	NA	
<input type="checkbox"/> Volkswagen Jetta SportWagon 4 cyl, 2 L, Manual 6-spd, Diesel	 30 city 41 hwy	\$2029	6.2	NA	
<input type="checkbox"/> Volkswagen Jetta 4 cyl, 2 L, Automatic (S6), Diesel	 29 city 40 hwy	\$2091	6.4	NA	
<input type="checkbox"/> Volkswagen Jetta SportWagon 4 cyl, 2 L, Automatic (S6), Diesel	 29 city 40 hwy	\$2091	6.4	NA	
<input type="checkbox"/> Mercedes-Benz E320 Bluetec 6 cyl, 3 L, Automatic 7-spd, Diesel	 23 city 32 hwy	\$2657	8.1	NA	

[Learn More About EPA's New MPG Tests!](#)

Personalize....

- [Use your gas prices and Annual Miles](#)
- Switch Units: [Gallons/100 Miles](#) [Liters/100 km](#)
- [Show Air Pollution Scores for CA and Northeast States](#)

Diesel Selective Catalytic Reduction



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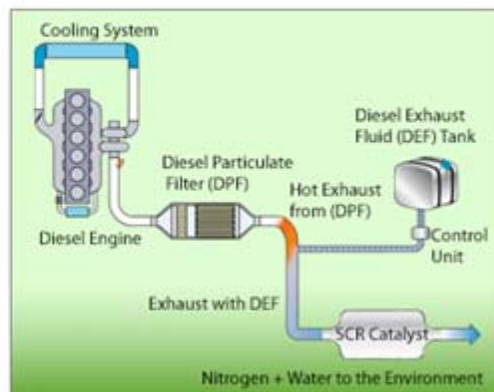
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Diesel Selective Catalytic Reduction

Selective catalytic reduction (SCR) is an advanced emission-control technology that can help light-, medium-, and heavy-duty diesel vehicles meet stringent [regulations](#) on nitrogen oxides (NO_x) emissions. In an SCR system, a liquid reducing agent composed of urea and water—known as [Diesel Exhaust Fluid](#) (DEF)—is combined with engine exhaust in the presence of a catalyst to convert smog-forming NO_x into harmless nitrogen and water vapor. See the diagram below.

Schematic of a Selective Catalytic Reduction (SCR) System



Diesel Exhaust Fluid



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Diesel Exhaust Fluid

Diesel Exhaust Fluid (DEF)—sometimes known simply by the name of its active component, urea—is a key component of [selective catalytic reduction](#) (SCR) systems, which help diesel vehicles meet stringent [emission regulations](#). DEF is a liquid reducing agent that reacts with engine exhaust in the presence of a catalyst to convert smog-forming nitrogen oxides (NO_x) into harmless nitrogen and water vapor.

Composition

Current DEF formulations are a nontoxic, colorless, and odorless mixture of the chemical urea and purified water. The use of alternative reducing agents—such as diesel fuel—is also being explored.

Urea is a nitrogen-containing compound that transforms into ammonia when heated. It occurs naturally or is synthesized from natural gas and is used in various industries, including as a fertilizer in agriculture. A urea-based DEF is used widely in Europe under the brand name [AdBlue](#).

Use in Diesel Vehicles

Diesel Exhaust Fluid is carried onboard a vehicle in a tank separate from the fuel tank. The vehicle's DEF tank must be refilled periodically. Experience in Europe indicates that average DEF consumption is about 5% of diesel fuel consumption. Refilling the DEF tank occurs at approximately the interval of recommended oil changes for light-duty vehicles. The interval varies based on application for medium- and heavy-duty vehicles.

Diesel Exhaust Fluid Locator (Still in development)



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Diesel Exhaust Fluid Locator

The [Diesel Exhaust Fluid Locator](#) helps users locate facilities that sell Diesel Exhaust Fluid (DEF, sometimes called urea). DEF is a liquid reducing agent used in [selective catalytic reduction](#) (SCR) systems to reduce [emissions](#) of nitrogen oxides (NO_x) from diesel vehicles.



To learn more about DEF, visit the [Diesel Exhaust Fluid](#) page. Visit the [Light-Duty Diesel Availability](#) page to see which light-duty vehicles require DEF.

The DEF Locator includes details for each DEF provider, including address, phone number, public/private status, type of location, hours of operation, dispensing capability, vehicle access, DEF recycling capability, and more. The data are provided by the [Alliance of Automobile Manufacturers](#) and are updated monthly. Detailed information is available on the DEF Locator Instructions page.

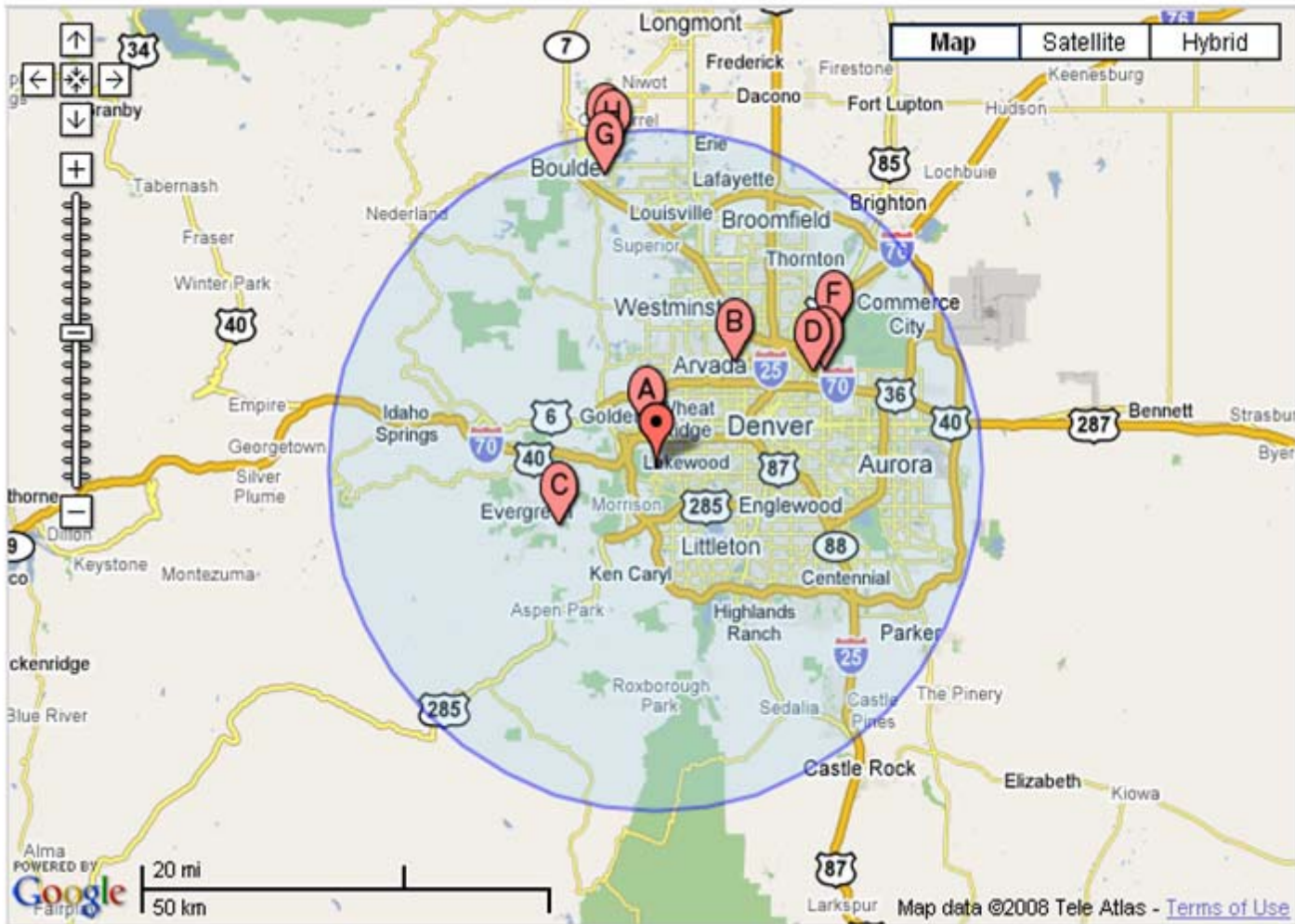
If DEF providers have addresses that cannot be located by the mapping application, the providers might be mapped in incorrect locations. You should call a provider before visiting to verify its location, hours of operation, and type of access.

The DEF Locator is dynamically generated. If you are using a specialized screen reader and having difficulty understanding the content, contact the [AFDC Webmaster](#), who can assist you with a verbal or written description.

Plans for the DEF Locator

- Application will run using Google Maps
- Basic search will provide a quick search for most users' needs
- Advanced search will meet additional needs
 - Will search by location type, access type, DEF dispenser type, vehicles serviced, and payment methods
- Route-mapping capability will also be available

Example Map Output



Scheduled Release of DEF Locator

- Some original equipment manufacturers (OEM) anticipate the public release of light-duty diesel vehicles utilizing DEF in fall 2008
- General-educational portions of the Diesel Vehicles section went live in late July 2008
- Diesel Exhaust Fluid Locator is due to go live early fall 2008 in conjunction with the release of OEM light-duty diesel vehicles