Getting the Word Out: Diesel Exhaust Fluid (DEF) Locator, Mapping Tools, and Outreach Activities

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Why are DEF Outreach Efforts Needed?

- Light-duty diesels are ready to enter the marketplace
- 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 interested in fuel economy and want to know about selective catalytic reduction (SCR) technologies and why these vehicles need DEF
- DEF is new and no one knows where to find it
What Is Being Done?

- The U.S. Department of Energy (DOE) and National Renewable Energy Laboratory (NREL) are working with the Alliance of Automobile Manufacturers to help get the word out about DEF and SCR technologies.
  
  - Expanded information on the Alternative Fuels and Advanced Vehicles Data Center (AFDC), [www.afdc.energy.gov](http://www.afdc.energy.gov)
    - DEF Locator
    - GIS Mapping Tool
    - Diesel content online to assist with education
  
  - Additional DEF activities
    - [www.factsaboutscr.com](http://www.factsaboutscr.com)
    - Press releases
  
- Light- and heavy-duty original equipment manufacturers (OEMs) are invested in outreach efforts to assist with vehicle sales and consumer satisfaction.
What Is the 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
The Alternative Fuels and Advanced Vehicles Data Center (AFDC) 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.
Why Diesel Information on AFDC?

- Fuel-efficiency improvements to light-duty diesels lead to reduced dependence on foreign oil
- Education and training is needed
- 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:
  - DOE
  - NREL
  - 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

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 (DECSS) 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.
Light-Duty Diesel Vehicle Availability

According to J.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.)
## 2009 Diesel Vehicles

Select up to 4 models to compare.

<table>
<thead>
<tr>
<th>Model</th>
<th>New EPA Mpg</th>
<th>Annual Fuel Cost</th>
<th>Carbon Footprint</th>
<th>Air Pollution Score</th>
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</thead>
<tbody>
<tr>
<td>Volkswagen Jetta 4 cyl, 2 L, Manual 6-spnd, Diesel</td>
<td>30 city, 41 hwy</td>
<td>$2029</td>
<td>8.2</td>
<td>NA</td>
</tr>
<tr>
<td>Volkswagen Jetta SportWagen 4 cyl, 2 L, Manual 6-spnd, Diesel</td>
<td>30 city, 41 hwy</td>
<td>$2029</td>
<td>6.2</td>
<td>NA</td>
</tr>
<tr>
<td>Volkswagen Jetta 4 cyl, 2 L, Automatic (S6), Diesel</td>
<td>29 city, 40 hwy</td>
<td>$2091</td>
<td>6.4</td>
<td>NA</td>
</tr>
<tr>
<td>Volkswagen Jetta SportWagen 4 cyl, 2 L, Automatic (S6), Diesel</td>
<td>29 city, 40 hwy</td>
<td>$2091</td>
<td>6.4</td>
<td>NA</td>
</tr>
<tr>
<td>Mercedes-Benz E320 Bluetec 6 cyl, 3 L, Automatic 7-spnd, Diesel</td>
<td>23 city, 32 hwy</td>
<td>$2657</td>
<td>8.1</td>
<td>NA</td>
</tr>
</tbody>
</table>
Diesel Selective Catalytic Reduction

**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 (NOx) 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 NOx into harmless nitrogen and water vapor. See the diagram below.

**Schematic of a Selective Catalytic Reduction (SCR) System**

![Diagram of SCR System]

- Diesel Engine
- Diesel Particulate Filter (DPF)
- Diesel Exhaust Fluid (DEF) Tank
- Hot Exhaust from (DPF)
- Control Unit
- SCR Catalyst
- Nitrogen + Water to the Environment
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 (NOx) 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.
DEF Locator and GIS Mapping Tool

- The DEF Locator will allow users to map DEF locations, get driving directions to a DEF retailer, map a route, and search using “advanced options”

- The GIS Mapping Tool provides a high-level view of DEF locations, including planned and existing locations
Diesel Exhaust Fluid Locator  (Still in development)

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 (NOx) 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.
Diesel Exhaust Fluid Locator (Still in development)

Enter an Address, City, State, or Zip Code
San Diego, Co
Show stations within 25 mile radius

Search

Data for this tool are provided by the Alliance of Automobile Manufacturers.

Results 1 to 2 of 2

A
E-W Truck And Equipment
6330 Federal Blvd
San Diego CA 92114
Phone: 819-263-2111
Distance: 5.98 Miles

B
Carl’s Trailer Rentals Inc
5024 Kearny Villa Rd
San Diego CA 92123
Phone: 858-571-5495
Distance: 8.32 Miles
Diesel Exhaust Fluid Locator (Still in development)

Find DEF Locations  Map a Route  Advanced Options

Enter your route using Address, City, State, or Zip Code
Starting Location
San Diego, Ca
Ending Location
San Francisco, Ca
Show stations within ___ miles of my route

Note: Printing this page will provide information about each location where exhaust fluid is available along your route.

San Diego, CA
501 mi (about 7 hours 40 mins)

1. Head north on 1st Ave toward W Ash St 0.4 mi
2. Turn left to merge onto I-5 N 429 mi
3. Continue on I-580 W (signs for I-580/Tracy/San Francisco) 62.1 mi
4. Take exit 19A on the left for I-80 W toward San Francisco 0.6 mi
5. Keep right at the fork to continue toward I-80 W and merge onto I-80 W 7.6 mi

Results 1 to 4 of 4

[Map showing routes and locations]
Diesel Exhaust Fluid Locator (Still in development)

Search by Address, State, or Route
- Address
- State
- Route

Enter an address and a search radius

Show stations within [radius] mile radius

Advanced Search Criteria (Optional)
- Site Type:
  - All Locations
  - OEM Dealerships
  - Gas Station
  - Oil Changing Facilities
  - Other Retail
- Site Access:
  - All Locations
  - Public
  - Private
  - Access Card Required
- Dispensing Capacity:
  - All Types
  - Bottle
  - Leak-proof Bottle
  - High Flow Pump
- Diesel Fuel Availability:
  - Show All Sites
  - Diesel Available
  - No Diesel Available
- Vehicles Serviced:
  - All Types
  - Light-Duty
  - Heavy Duty
  - Fleets
- Service Available:
  - Show All Sites
  - "Do it for Me"
  - "Do it Yourself"

Search

Data for this tool are provided by the Alliance of Automobile Manufacturers.
DEF GIS Map (Still in development)
All Retailers
DEF GIS Map (Still in development)
All Retailers Zoom Function
Status Report

- General-educational portions of the Diesel Vehicles section are now live on the AFDC

- Some OEMs anticipate the public release of light-duty diesel vehicles utilizing DEF in early 2009

- The Diesel Exhaust Fluid Locator and the GIS Mapping Tool are due to go live in January 2009
DEF Web Site URLs

- [www.afdc.energy.gov](http://www.afdc.energy.gov)
  - Note: Once the mapping tools go live, a short URL ([www.fueltools.gov](http://www.fueltools.gov)) will take users directly to the DEF Locator and other locator tools on AFDC

- [www.factsaboutscr.com](http://www.factsaboutscr.com)