FAQs

Q: Why SCR?

A. Selective Catalytic Reduction (SCR) technology is the most cost-effective method to reduce NOx emissions and reduce our environmental imprint.

Q: Is SCR proven technology?

A. Absolutely. Isuzu has been developing next generation emission technologies for many years. Europe has more than 600,000 trucks using SCR. SCR has become the global standard for meeting the most stringent diesel engine emissions requirements.

Q: What is Diesel Exhaust Fluid (DEF)?

A. DEF is a solution of 32.5% automotive grade urea and 67.5% pure water. DEF is classified as a non-hazardous substance by the EPA and the Department of Homeland Security. When injected into an SCR Catalyst, DEF can reduce over 85% of the harmful NOx found in diesel exhaust to harmless nitrogen gas and water vapor.

Q: How much DEF will I Use?

A. DEF usage will be under 2% of diesel fuel usage for most operators. A typical Isuzu N-Series truck will use about 1 gallon of DEF per week.

Q: How much will DEF Cost?

A. The retail cost of DEF will be determined by the market conditions. In Europe, DEF currently costs about $2.50 per gallon.

Q: Where can I buy DEF?

A. DEF will be sold at truck stops and diesel refueling stations, as well as your local Isuzu dealer. All vehicles equipped with SCR will use the same specification for DEF. Since SCR will be used by almost all manufacturers to meet EPA 2010 emissions regulations, DEF will be readily available across the country.

Q: How will the operator be affected?

A. SCR requires less driver interaction than current DPF systems. The SCR system operates automatically, and does not require driver intervention. A fluid level indicator on the dash provides alerts to the driver to refill the tank. These alerts start hundreds of miles before the vehicle runs out of DEF. Refilling the DEF tank will be similar to refilling the windshield washer fluid bottle.

Q: What happens if I run out of DEF? Will I get stranded by the side of the road?

A. The vehicle will clearly communicate the DEF level to the driver. Visual and audible alarms will sound alerting the driver that the vehicle is running out of DEF hundreds of miles before the tank is empty. If the driver chooses to ignore these numerous alerts, and runs the vehicle out of DEF, the engine will go into a performance-restricted mode and will eventually no longer restart. However, the engine will not stop running and strand the driver if the vehicle runs out of DEF.

Q: How will these new emissions regulations affect fuel consumption?

A. Isuzu expects vehicles meeting the EPA 2010 emissions requirement to offer better fuel consumption than current vehicles.

Q: How will maintenance be affected with this new technology?

A. Minimal maintenance is required of the SCR system. The system has a DEF filter. This is a simple spin-on cartridge filter that will need to be replaced every 1-2 years. All other vehicle maintenance intervals will be unchanged.

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ISUZU TRUCK

ISUZU
TRUCK

SCR

Selective Catalytic Reduction

SEE
SAFETY · ECONOMY · ENVIRONMENT

The "Greenest" Isuzu Ever

On March 16, 1984, Isuzu low cab forward trucks were introduced to the U.S. market. Isuzu's corporate philosophy was to grow its business in harmony with people and society. Twenty-five years later, this same strategy is the foundation of Isuzu's SEE (Safety, Economy, and Environment) philosophy.

This fundamental concern for the environment, and the people who live in it, has driven Isuzu to be one of the world's leaders in "green" diesel technology. After many years of development and testing, Isuzu has determined that Isuzu diesel trucks will use Selective Catalytic Reduction (SCR) technology to meet the new EPA 2010 heavy duty vehicle emissions standards.

What is the EPA 2010 Emission Standard?

The purpose of the 2010 emissions standard is to further reduce NOx emissions from heavy duty engines. Simply stated, NOx is a generic term for oxides of nitrogen (primarily NO and NO_2). These oxides are produced in the cylinder of an engine during the high temperatures of combustion. Starting January 1st, 2010, engine NOx emissions must be reduced by 85% over current levels. This new level of reduction results in a cumulative NOx reduction of 99% from 1974 levels, and clearly makes diesel engines clean, green technology. The implementation of this standard will have an overwhelmingly positive impact on our environment and on the air that we breathe in the future.

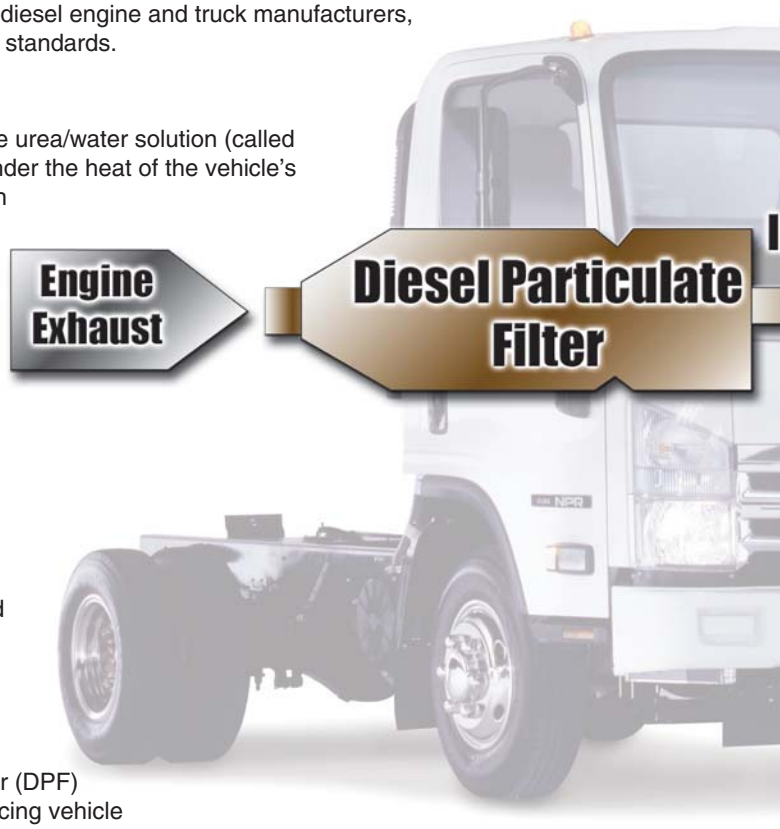
Why Use Selective Catalytic Reduction (SCR) Technology?

After many years of extensive testing and study, Isuzu has determined that SCR is the most cost-effective, reliable, and fuel-efficient way to meet the very strict EPA 2010 emissions standards. The ability to meet strict requirements affordably without compromising vehicle performance, operating cost and uptime is essential. In commercial trucking, the ability to reduce emissions to near-zero levels while also delivering fuel savings and improved engine reliability distinguishes SCR as the preferred emissions control technology that is as good for business as it is for the environment.

These considerations have led Isuzu, as well as the majority of other diesel engine and truck manufacturers, to select SCR as the technology of choice to meet EPA 2010 emissions standards.

How SCR Works

SCR works by injecting a very precise amount of an automotive grade urea/water solution (called Diesel Exhaust Fluid, or DEF) into the vehicle's hot exhaust stream. Under the heat of the vehicle's exhaust, the urea in the DEF is converted into ammonia gas and carbon dioxide. Once inside the SCR catalyst, this ammonia gas forms a chemical reaction with the oxides of nitrogen (NOx) emitted by the engine. As a result of this chemical reaction, SCR is able to reduce harmful oxides of nitrogen into harmless water vapor and nitrogen gas – natural elements common to the air we breathe.



The SCR Performance Advantage

When EPA 2010 standards go into effect, no heavy duty on-highway engine can emit oxide of nitrogen (NOx) levels higher than 0.2 g/bhp-hr (grams per brake horsepower-hour). This is the most stringent emissions standard in the world.

In Europe, where SCR technology has been in use for several years, SCR operators have demonstrated lower operating costs and increased truck resale values. It is the only technology that optimizes fuel efficiency while allowing the engine to run cleaner. SCR is reliable and reigns as the dominant emissions control technology in Europe where more than 600,000 SCR-equipped trucks are in operation today.

Isuzu's decision to combine SCR with existing Diesel Particulate Filter (DPF) technology will reduce engine emissions to near-zero levels, while reducing vehicle operating costs and increasing vehicle performance.

Public Health Impact

The direct health implications of vehicle emissions, including exhaust from cars and trucks, are a concern to us all. Oxides of Nitrogen (NOx), originating from gasoline and diesel engines are a major air pollutant that contributes to smog and ozone formation. This can negatively impact our health, and can contribute to symptoms of asthma, respiratory and heart diseases. For these reasons, EPA 2010 is the most positive emissions control ever implemented.

Alternative Technology

Exhaust Gas Recirculation (EGR), is an alternative technology offered by a limited number of manufacturers to meet EPA 2010 emissions requirements. Isuzu has been in production with diesel engines using EGR for over 10 years, and will continue to use EGR in engines meeting the 2010 emissions requirements. While EGR is a known, proven, and effective way to reduce engine NOx emissions, Isuzu engineers felt that relying on EGR alone to meet the extremely low NOx levels required by the EPA 2010 regulation would require a massive increase in EGR rates that would increase engine heat rejection, increase internal stresses on engine components, and increase engine fuel consumption. Given these considerations, Isuzu has chosen to combine EGR with SCR to produce an extremely clean engine with the best-in-class reliability and lowest operating costs that Isuzu is known for.

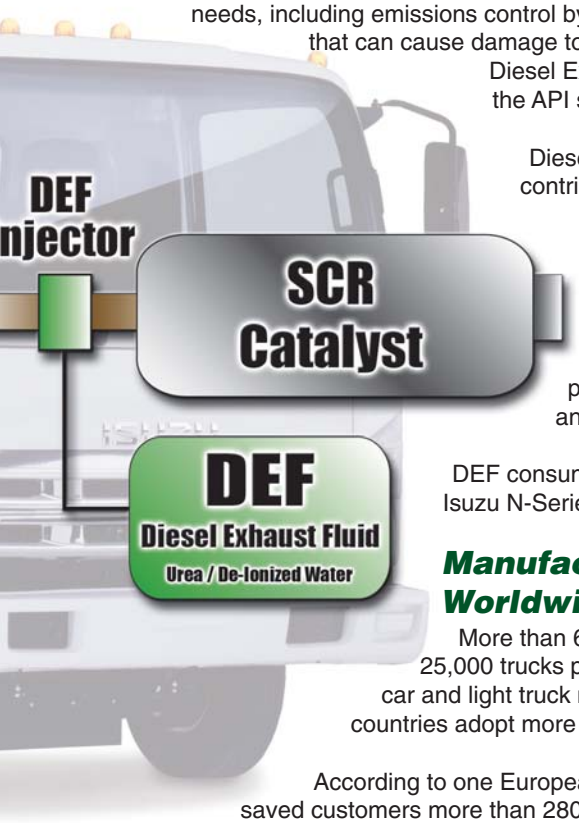
What is Diesel Exhaust Fluid (DEF)?

Diesel Exhaust Fluid (DEF) is a solution made of purified water and 32.5% automotive-grade urea. This is the carrying agent for the ammonia needed to reduce nitrogen oxide (NOx) emissions from vehicles into nitrogen, water and carbon dioxide (CO_2).

This fluid is known by the trade name "AdBlue" in Europe. The Diesel Exhaust Fluid sold in the US will meet the exact same specifications as the fluid that has been sold in Europe for years. The fluid is colorless, largely odorless, and is classified by the EPA and Department of Homeland Security as a non-hazardous substance.

DEF has a freezing point of +12 degrees Fahrenheit. This means that in cold weather, the tank and DEF lines could freeze without keeping them warm. This concern has been taken into account in the design of all SCR systems. These systems have been in use in Europe for years, and cold weather use in Scandinavian countries has not been an issue. The Isuzu SCR system will have a heated tank and lines that will keep the DEF thawed. The EPA allows a suitable warm-up time for the DEF tank and lines to thaw. As a result, Isuzu does not anticipate any changes in cold-weather starting or operating procedures as a result of SCR implementation.

The process of manufacturing and distributing Diesel Exhaust Fluid is certified for quality by the American Petroleum Institute. The urea used for Diesel Exhaust Fluid is automotive-grade. Do not confuse this grade with different grades used for agricultural and industrial needs, including emissions control by public utilities and power plants. These other grades of urea may carry contaminants that can cause damage to the vehicle's emissions control system. This damage will not be covered under warranty. Diesel Exhaust Fluid appropriate for use in engine emissions systems will be clearly labeled with the API seal of approval.



Diesel Exhaust Fluid, a major component of SCR operation, has four additional factors that contribute to the viability of SCR:

- Availability
- Purity and quality
- Transportation and distribution networks
- Dispensing equipment and packaging alternatives

Diesel Exhaust Fluid (DEF), will be available at truck stops, diesel fuel stations, and in prepackaged containers from your Isuzu truck dealership and truck and automotive parts and accessory outlets.

DEF consumption will be approximately 2% of diesel fuel consumption. This means that a typical Isuzu N-Series diesel truck will use about 1 gallon of DEF per week.

Manufacturers are Adopting Urea SCR as a Worldwide Technology

More than 600,000 diesel trucks in Europe now use SCR and the fleet is growing by approximately 25,000 trucks per month. SCR technology is not limited to medium and heavy-duty trucks. Passenger car and light truck manufacturers around the world are adopting SCR technology as all industrialized countries adopt more stringent emissions requirements.

According to one European Truck manufacturer, the engine efficiency achieved by using SCR technology has saved customers more than 280 million liters of diesel fuel and nearly half a billion dollars in fuel spending. At the same time, 800,000 metric tons of carbon dioxide have not entered the environment.

With Isuzu, It's Easy Being Green

Isuzu's SEE philosophy means that a commitment to Safety, Economy, and the Environment is reflected in every truck made. Isuzu is committed to meeting the world's most stringent emissions requirements without impacting vehicle operating costs, reliability, or uptime. Isuzu's 2011 model year vehicles will meet the EPA's 0.2 g/bhp-hr NOx requirements with improved fuel consumption, no reduction in maintenance intervals, and the world-class reliability that has resulted in Isuzu-built trucks being the number one selling Low Cab Forward vehicle in the U.S. for 23 years and counting.