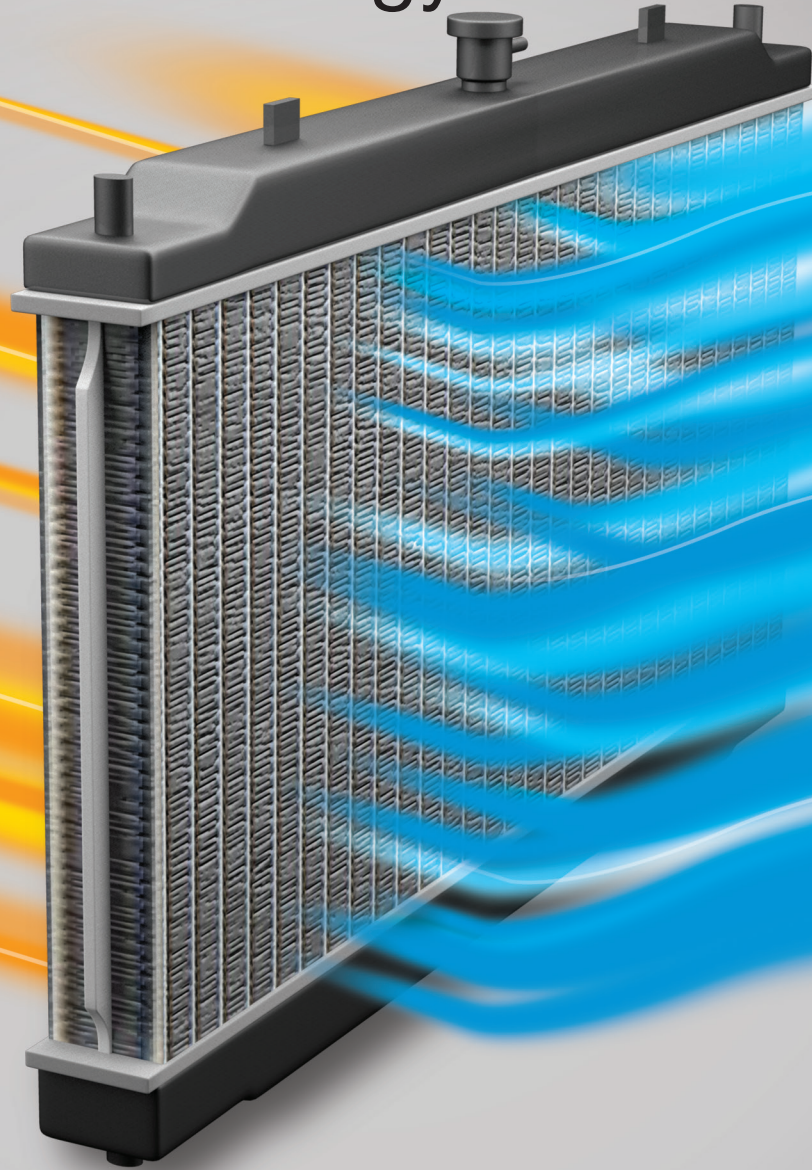


# PremAir® NXT

Next Generation Direct Ozone  
Reduction Technology



 **BASF**  
We create chemistry

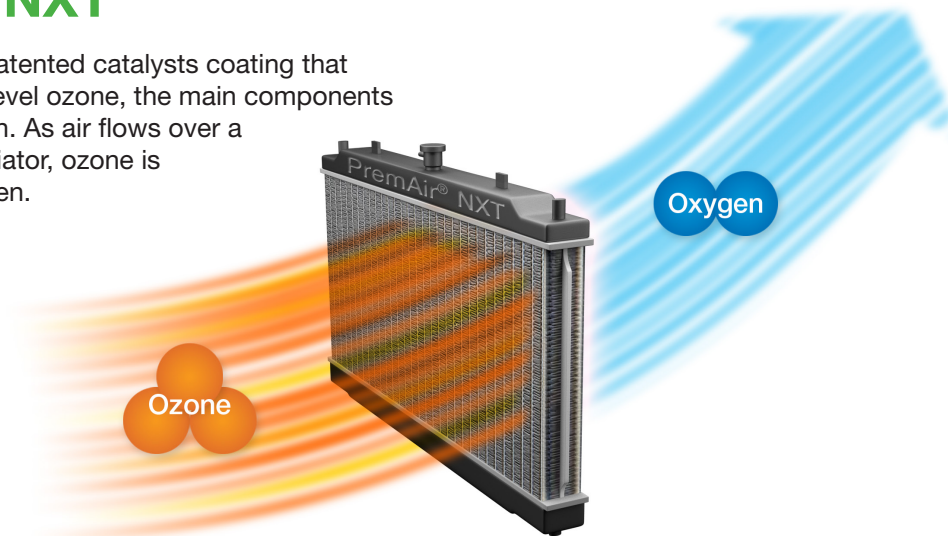
# PremAir® NXT helps meet LEV III & Tier 3 emission regulations

PremAir® NXT is the next generation Direct Ozone Reduction (DOR) technology. It is a patented catalyst coating that transforms ground level ozone, the main component of smog, into oxygen. As air flows over a vehicle's coated radiator, PremAir® NXT catalyzes the reaction that converts ozone into oxygen. This process capitalizes on the large volume of air that passes through a vehicle's radiator.

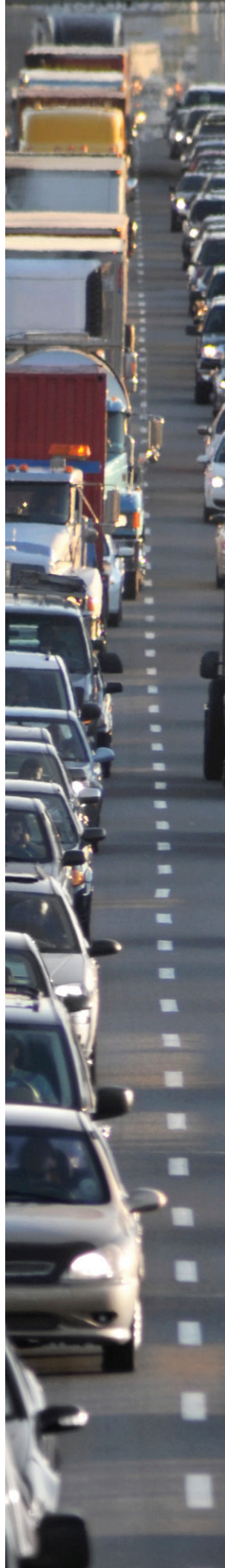
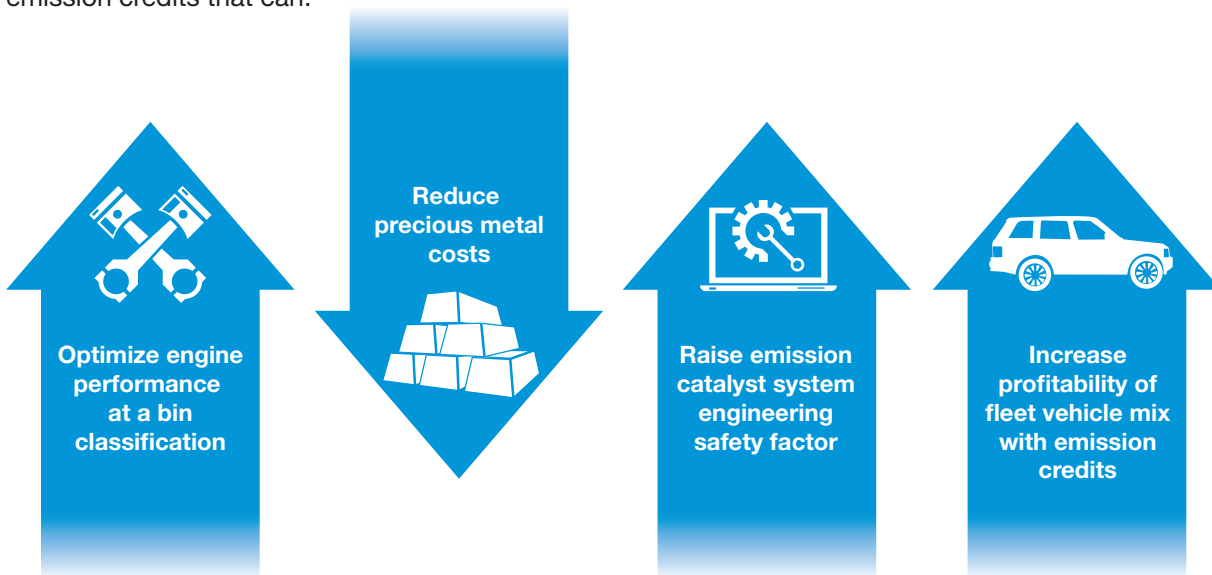
PremAir® NXT has increased catalyst efficiency and durability for 150,000 miles. With PremAir® NXT, even smaller radiators for today's downsized 4 cylinder engines can convert as much ozone to oxygen as larger radiators with standard PremAir®. This allows Automotive OEMs to earn the full emission credit for California LEV III and U.S. Tier 3 emission regulations.

## PremAir® NXT

PremAir® NXT is a patented catalysts coating that transforms ground level ozone, the main components of smog, into oxygen. As air flows over a vehicle's coated radiator, ozone is converted into oxygen.



PremAir® NXT is approved by the Air Resources Board of California and U.S. EPA for DOR emission credits that can:







## PremAir® NXT delivers value through emission reduction credits

PremAir® NXT is a DOR technology which has been validated for 150,000 miles or 15 years. Tier 3 and LEV III have approved an emission reduction credit of 5 mg/mile for DOR technology. OEMs can leverage this tool in a number of ways to deliver value to manage their fleet average emissions requirements.

### Optimize engine performance

- PremAir® NXT credits are a cost-effective alternative solution to PGM (Platinum Group Metals) content in catalytic converters and can be used to maximize engine performance at a bin classification

### Reduce cost

- As regulations demand more out of catalytic converters, additional PGM content can have decreasing emission control efficiency
- PremAir® NXT credits can help optimize PGM performance to reduce total emission control costs

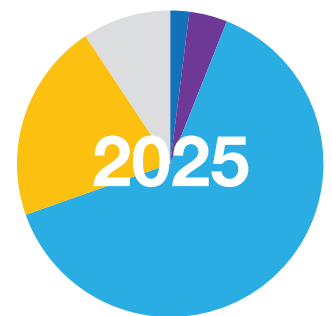
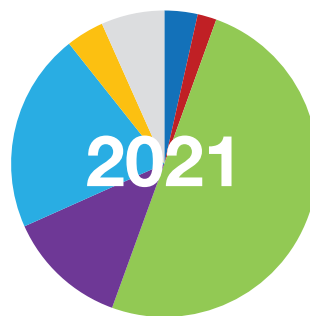
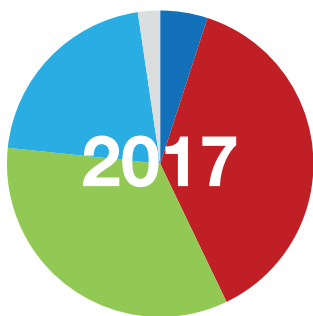
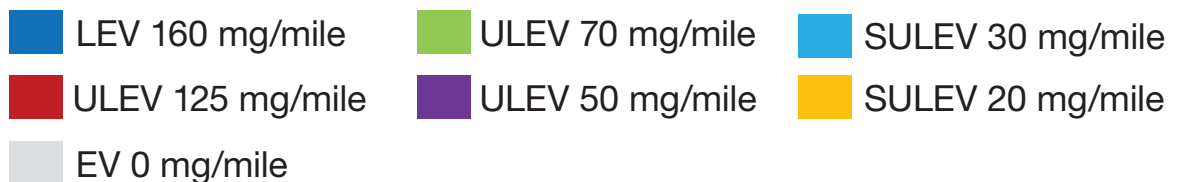
### Engineering Safety Factor for SULEV

- TWC performance at low NMOG and NOx levels is difficult to measure for both fresh and aged performance; borderline TWC aging performance can introduce risk to an OEM
- PremAir® NXT credits can be leveraged to increase the safety factor at a vehicle bin classification

### Managing your fleet vehicle mix

- LEV III and Tier 3 require OEMs to change their fleet percentage sales to meet the emission standards, so OEMs have to sell more SULEV vehicles while selling less ULEV 125 vehicles
- High performance sedans and coupes as well as trucks and SUVs are often more profitable but meet higher emission bins
- Utilizing PremAir® NXT credits can enable OEMs to mitigate the impact of new regulations on their vehicle mix

## The percentage of vehicles in each emission classification required to meet the NMOG+NOx emission standards in a given year

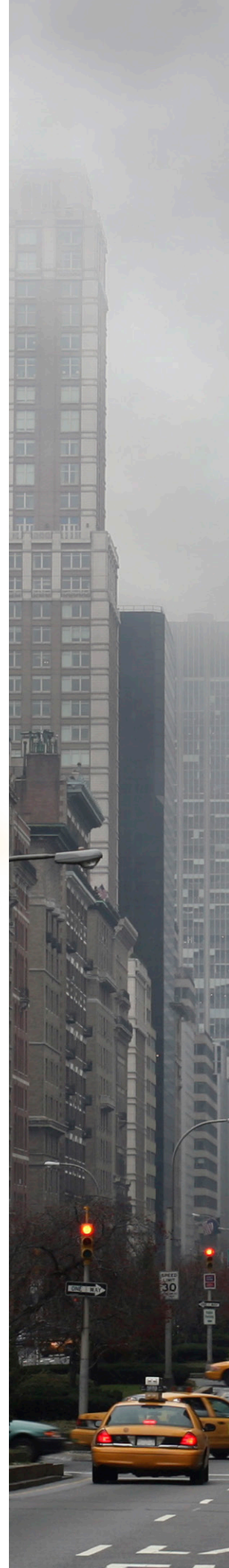
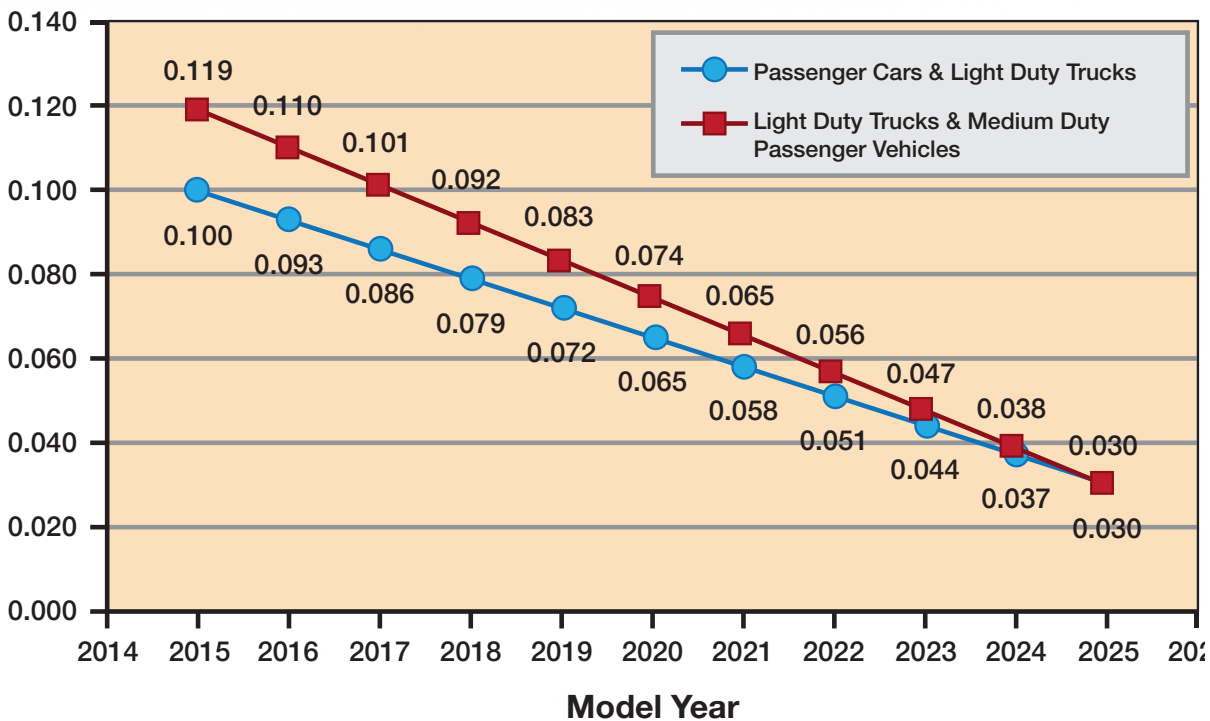


SULEV split moves from 25% to 80+%

## Increasingly stringent emission regulations

The California Office of Administrative Law has approved the *Low Emission Vehicle (LEV) III Amendments* as set forth by the Air Resources Board of California. These regulations:

- Phase-in lower fleet average emissions standards for cars, light-duty trucks, and medium duty vehicles
- Provide OEMs the flexibility to average, trade, and bank credits for the combined fleet by combining two emission pollutants NMOG and NOx, into one NMOG + NOx standard
- Require OEMs to reduce emissions for the entire fleet down to Super Ultra-Low Emission Vehicle (SULEV) standards by 2025
- U.S. Tier 3 Regulations harmonize with LEV III for the common goal of reducing emissions by 75%



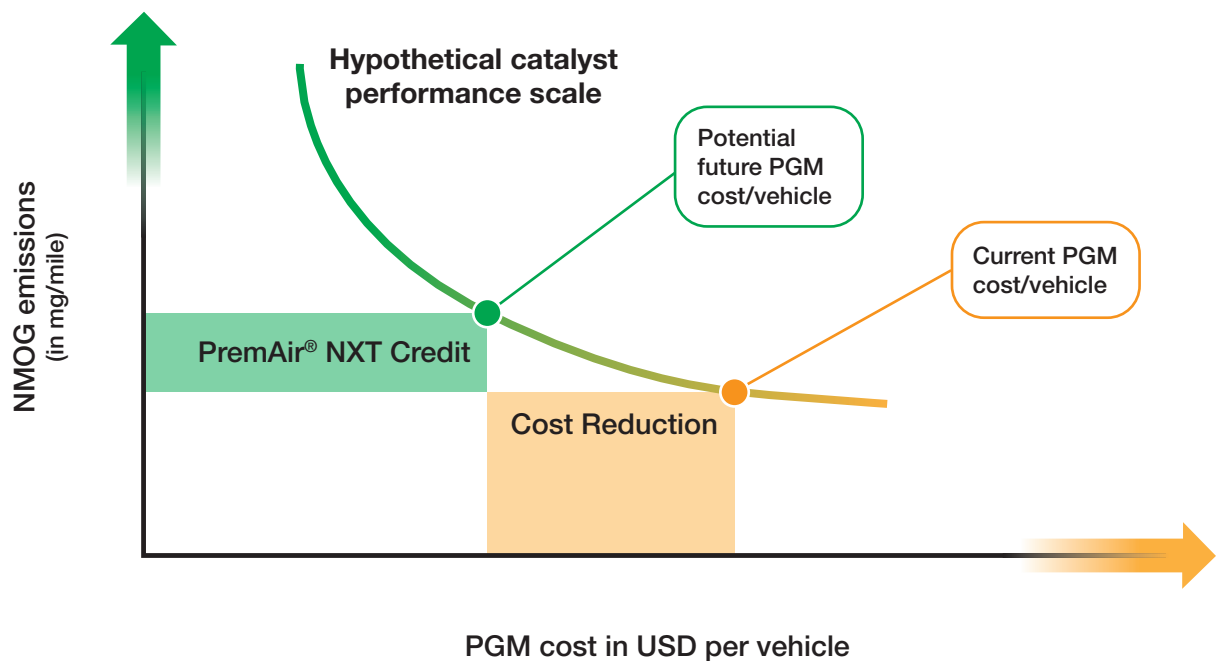




**BASF assists  
OEMs in earning  
maximum emission  
credits with  
PremAir® NXT**

With over ten years of experience and over three million cars on the road, BASF is well-suited to assist OEMs with the complicated task of gaining Air Resources Board of California and U.S. EPA approval for optimal award of PremAir® NXT emission credits. BASF offers automakers:

- Consultations throughout the entire process
- Calculation of credits
- Optimization of radiator geometry design to increase surface area and maximize credits
- Preparation of sample radiator with coating of PremAir® NXT
- Determination of catalyst ozone conversion
- Durability testing to determine aged performance
- Collaboration in preparing Air Resources Board of California data packet for submission
- Comprehensive quality assurance



## What is ozone?

Ozone is a molecule that consists of three oxygen atoms. Naturally-occurring ozone is formed miles above the earth in the stratosphere. This ozone layer is responsible for absorbing the sun's harmful ultraviolet radiation. Unfortunately, the ozone at ground level is the major component of smog. This artificially-created ozone is the cause of many adverse effects, such as irritation of and damage to:

- Lungs
- Eyes
- Noses
- Throats

Man-made ozone is produced by the oxidation of nitrogen oxides (NOx) and Volatile Organic Compounds (VOCs) in the presence of direct sunlight. The main sources of NOx and VOC gases are:

- Mobile emissions
- Industrial factories
- Electrical plants
- Chemical solvents
- Gasoline vapors

**PremAir® NXT**  
is a proven  
supplemental  
emission  
technology

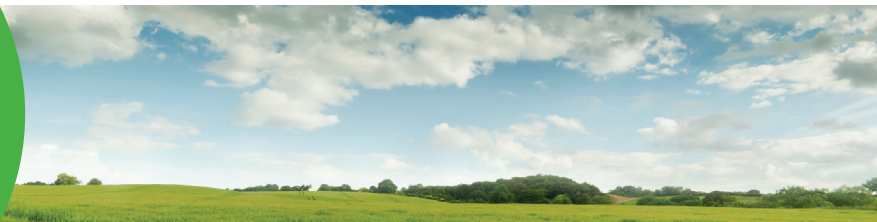
With the approval of the Air Resources Board of California and U.S. Tier 3 for Direct Ozone Reduction (DOR), PremAir® NXT is the ideal technology to earn emissions credits that can:

- Optimize engine performance at a bin classification
- Reduce Platinum Group Metal (PGM) costs
- Raise emission catalyst system engineering safety factors
- Increase the profitability of your fleet vehicle mix

### **PremAir® NXT requires little or no:**

- Engineering design changes
- Moving parts
- Complex systems
- Engine recalibration

As a turnkey solution to the increasing emission standards, PremAir® NXT meets the 15 years and 150,000 miles durability requirements. For a balanced emission control strategy, ozone reduction, and cleaner air, trust BASF's PremAir® NXT Catalyst System.



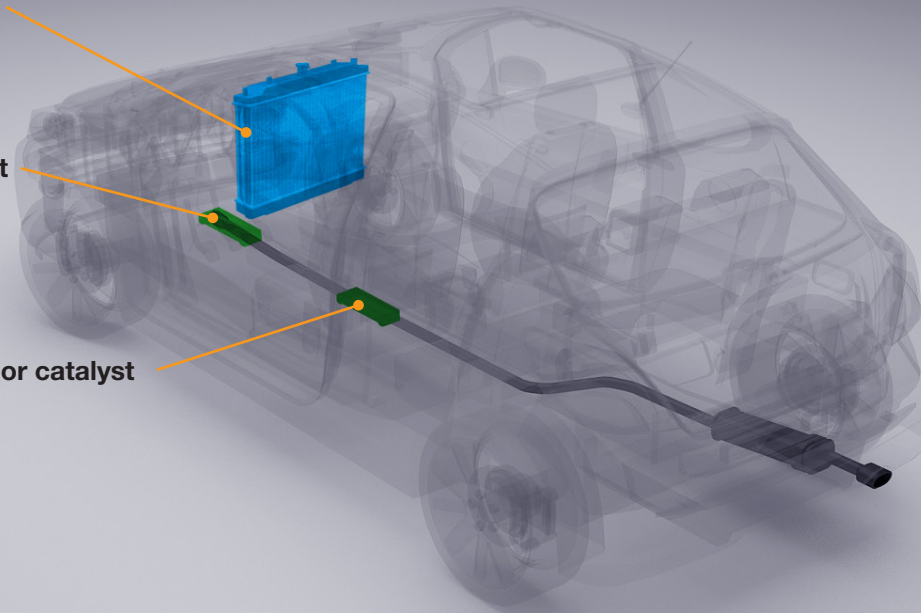




PremAir® coated radiator

Close-coupled catalyst

Under-floor catalyst



## BASF is your partner for meeting emissions requirements

With worldwide R&D and manufacturing resources and years of experience, BASF is the global leader in mobile emissions control for a cleaner environment. In addition to PremAir® NXT, BASF has innovated additional technologies to meet SULEV stringent emission regulations.

Regulation Challenge	BASF's Solution
0.02 g/mile NMOG + NOx emission limit	New materials to improve light-off
Durability to 150,000 miles	New materials with phosphorus resistance for increased stability
Stricter particulate matter limits for mass and number	FWC™, catalyzed gasoline particulate filter
Tighter evaporative emissions limits (E10)	EvapTrap™ air intake system hydrocarbon trap
SULEV 20	PremAir® NXT

BASF continues to offer environmental solutions for gasoline, diesel, and alternative fuel powered engines that are developed and supported by a worldwide network of expert scientists and engineers.



## About Us

BASF's Catalysts division is the world's leading supplier of environmental and process catalysts. The group offers exceptional expertise in the development of technologies that protect the air we breathe, produce the fuels that power our world and ensure efficient production of a wide variety of chemicals, plastics and other products, including advanced battery materials. By leveraging our industry-leading R&D platforms, passion for innovation and deep knowledge of precious and base metals, BASF's Catalysts division develops unique, proprietary solutions that drive customer success.

### **BASF - The Chemical Company**

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