

**We create
chemistry that
makes clean air
love vehicles.**



**Emissions Control
Catalysts**

Emissions Control Catalysts

Solutions

Emissions Professionals

As the global leader in catalysis, BASF has unsurpassed expertise in developing innovative emission control technologies for a wide range of applications, to enable clean air for a sustainable future. We are the Emissions Professionals.

Providing Clean Air

Protecting the atmosphere from harmful emissions is the focus of all innovative solutions. New engine technologies, tightening emission regulations and fluctuating precious metals prices create emissions control challenges. We help make our customers more successful with innovative, cost-effective solutions to meet the toughest emissions control regulations.

Emerging Technologies

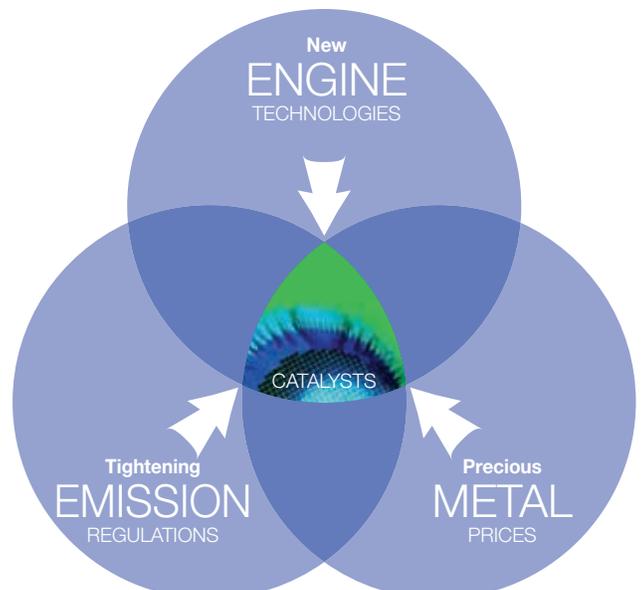
Always a step ahead with emerging technologies that are vital to protecting our air. BASF Solutions are in perfect step with the ever-evolving regulatory requirements.

Embedded Products

Embedded multiple solutions greatly enhance protection without requiring additional space.

The BASF Way

The focus of the BASF Emissions Professional is always on innovative, cost-effective solutions to meet the needs of customers. With a creative, open, responsible and entrepreneurial approach we help make our customer more successful.



Emissions Control Catalysts

Innovation Drives Sustainability

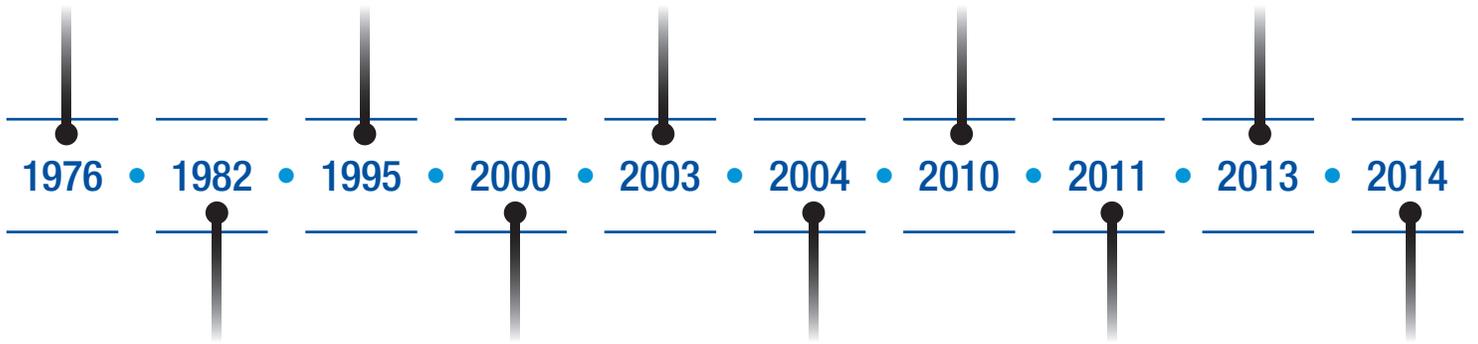
Developed the first three-way auto emissions catalyst

Earned first US EPA Urban Bus Retrofit certificate

Awarded the National Medal of Technology for Three-Way Catalysts development

Earned Edison Patent Award for advanced zeolite SCR catalyst

Announced FWC™ catalyst to remove 4 pollutants with 1 component from gasoline-engine exhaust



1976

1982

1995

2000

2003

2004

2010

2011

2013

2014

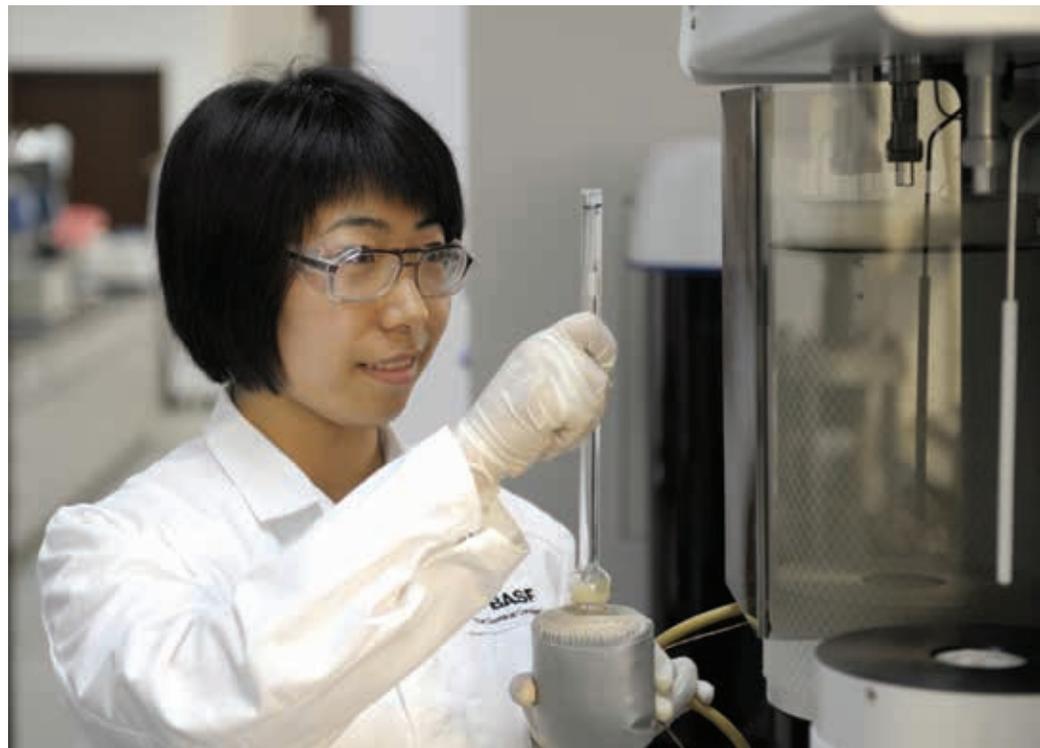
Awarded the United Nations "Award of the Decade" for environmental innovation and achievement

Commercialized the first catalyst system for destroying ozone

Commercialized the first catalyzed soot filter

Commercialized first emissions catalyst for non-road diesel engine applications

Introduced CSF.4 which can eliminate one catalytic component from diesel-engine exhaust systems



Emissions Control Catalysts

What does sustainability mean to BASF Mobile Emissions Catalysts?

For us, sustainable development means the combination of long-term oriented economic success with environmental protection and social responsibility.

We invest to develop emissions catalysts to enable clean air.

- Twice as many emissions catalysts patent applications over the last 6 years as our nearest competitor
- We support the automotive and commercial vehicle industry for development of fuel efficient engines
- Our products reduce CO, HC, NOx and particulate matter to meet the toughest emissions regulations
- It takes 100 cars with catalytic converters today to equal the emissions from just 1 pre-1974 car

We provide training, employment and development for over 3000 people.

- Manufacturing sites in US, Brazil, Germany, Poland, South Africa, China, India, Thailand, plus Japan and Korea through joint ventures
- R&D Sites in the US, Germany, China, plus Japan and Korea through joint ventures
- BASF plays an active role in the communities in which we operate, through our corporate charitable contributions and community relations efforts.

We also use resources efficiently to produce our products.

- Reduced greenhouse gases
- Cut use of drinking water for production
- Boosted energy efficiency in production processes
- Improved occupational safety
- Holistic life cycle thinking since 1996

BASF has been recognized as a global leader for sustainability.

- Global 100 Most Sustainable Corporations
- Dow Jones Sustainability Index
- Carbon Performance Leadership Index
- Individual customer awards





Waste Reduction

Holistic Life Cycle Thinking

- Integrated production utilizes by-products and waste whenever possible; trash is burned for steam production and we recycle paper, plastic, cardboard, metal, and wood
- 100% recycling of manufacturing waste streams with precious metal content
- Over 28% of precious metal in our raw material sourcing is from recycled sources

Sustainability in Procurement

In BASF's value chain, our suppliers play a critical role as we create chemistry for a sustainable future. BASF Procurement clearly describes and communicates our expectations to our suppliers. We focus on more than price, quality and time. Our suppliers must comply with environmental, social and governance expectations.

Inspired by the United Nations Global Compact initiative and the chemical industry's Responsible Care program, our Supplier Code of Conduct makes our expectations clear. For more information, please visit: www.basf.com/group/corporate/en/products-and-industries/procurement/Compliance/Index



Greenhouse gases

Invested in more efficient equipment for production

- New ovens cut 1838 tons CO₂/year
- New dryers saved 490 tons CO₂/year



Drinking Water

Continuously improving processes to reduce water use

- New process at one plant saves over 3 million gallons of water per year



Energy Efficiency

Invested in more energy efficient equipment

- Upgraded lighting in production plant resulting in 540,000 kWh saved per year



Occupational Safety

We never compromise on safety

- This is a commitment enshrined in our strategy
- It is part of our Culture of Excellence

Sites around the globe



Sroda Slaska
Poland
Production

Germany
Production - Nienburg
R&D - Hannover



US
Production - Huntsville, AL
R&D - Iselin & Union, NJ



Indaiatuba
Brazil
Production



Port Elizabeth
South Africa
Production



Shanghai, Guilin
China
Production and R&D



Chennai
India
Production

Japan
Production and R&D*

Korea
Production and R&D*

Rayong
Thailand
Production



Strong position in Asia through joint ventures

Japan - N. E. Chemcat Corporation
Korea - Heesung Catalysts Corporation

- BASF and JV partners have leading mobile emissions catalysts market share in Asia
- Access to a high percentage of global transplant business with leading OEMs
- Greater R&D capabilities and collaboration

Deepest R&D resources

Over 1100 catalyst experts drive innovation in our global R&D and Engineering network. They are supported by over 10000 scientists in the global BASF R&D Verbund, with a history of recognized innovation, including the UN Award of the Decade and the National Medal of Technology for the invention of the automotive catalytic converter.

Global manufacturing network

- Local supply of global technology
- Quality certified
- Adding capacity to support growth



* joint venture

Emissions Control Catalysts

Gasoline Emissions Catalysts

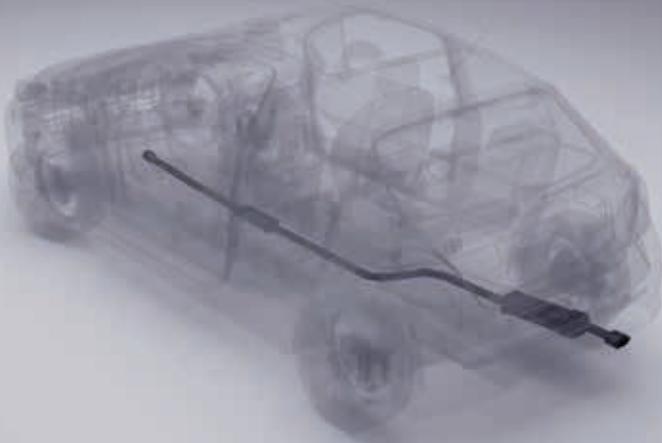
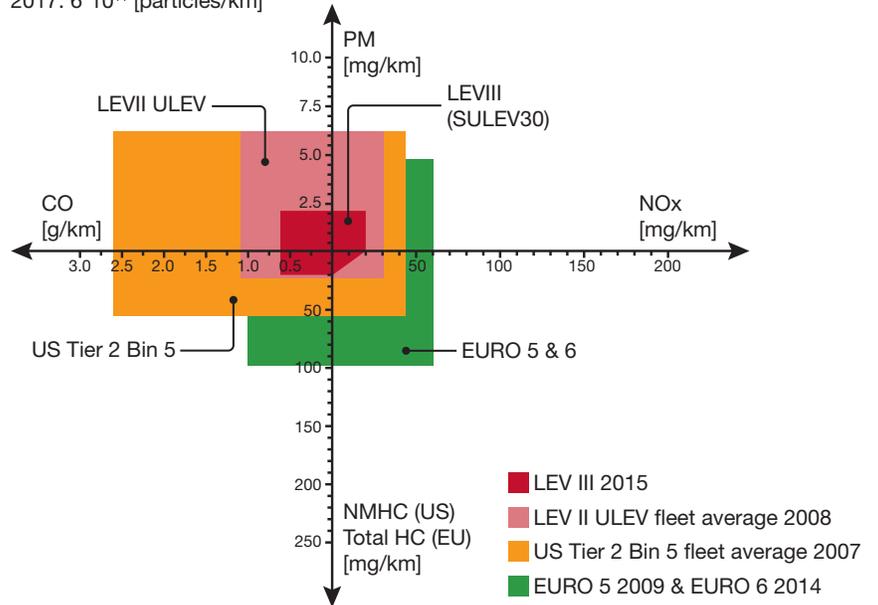
New emission regulations such as Euro 6, LEV III and Tier 3 are creating challenges. Without innovation, these tightening regulations and durability requirements would mean larger, heavier emission control systems. As the leading innovator with global R&D and manufacturing, we offer unique solutions to meet these challenges.

Change	Challenge	Solution
NMOG+NO _x *	Tighter limits	New materials to improve light-off
Durability	Improved stability	New materials (phosphorus resistance)
Particle limits	Particle mass & number	Gasoline particulate filter
Evaporative emissions	Tighter limits	Improved intake air hydrocarbon trap

*Non-methane organic gases + nitrogen oxides

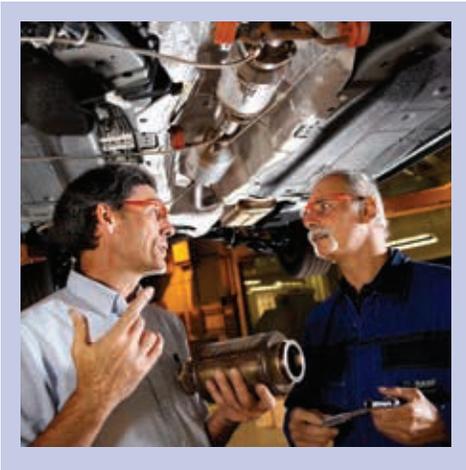
Gasoline Engine

Particle number limit for EU 6:
2014: $6 \cdot 10^{12}$ [particles/km]
2017: $6 \cdot 10^{11}$ [particles/km]



Emissions Control Catalysts

TWC



TWC technology for gasoline engines. A leader in clean air technology, BASF has unsurpassed expertise in the development of catalysts for a wide range of applications that protect the air we breathe. Catalyst expertise enabled us to pioneer the development of the first catalytic converters for automobiles, which appeared on 1975-model cars. A year later, we introduced a major innovation — the modern, Three-Way Conversion catalyst (TWC), which today is capable of destroying over 90% of hydrocarbons (HC), carbon monoxide (CO) and oxides of nitrogen (NO_x) produced by gasoline engines. In fact, it would take over 100 of today's cars to equal the pollution from one pre-1974 car.

We were awarded the National Medal of Technology and the United Nations Award of the Decade, for the development of the first three-way automotive emissions control catalyst. Arguably the most important pollution abatement device ever invented, the catalytic converter now is a key component of most new cars around the world.

Today, BASF continues to lead the way in the development and commercialization of advanced emissions catalysts. We work closely with our customers to manage the precious metal content in the catalysts. Our focus is on helping our automotive customers cost-effectively comply with tightening environmental regulations around the world.

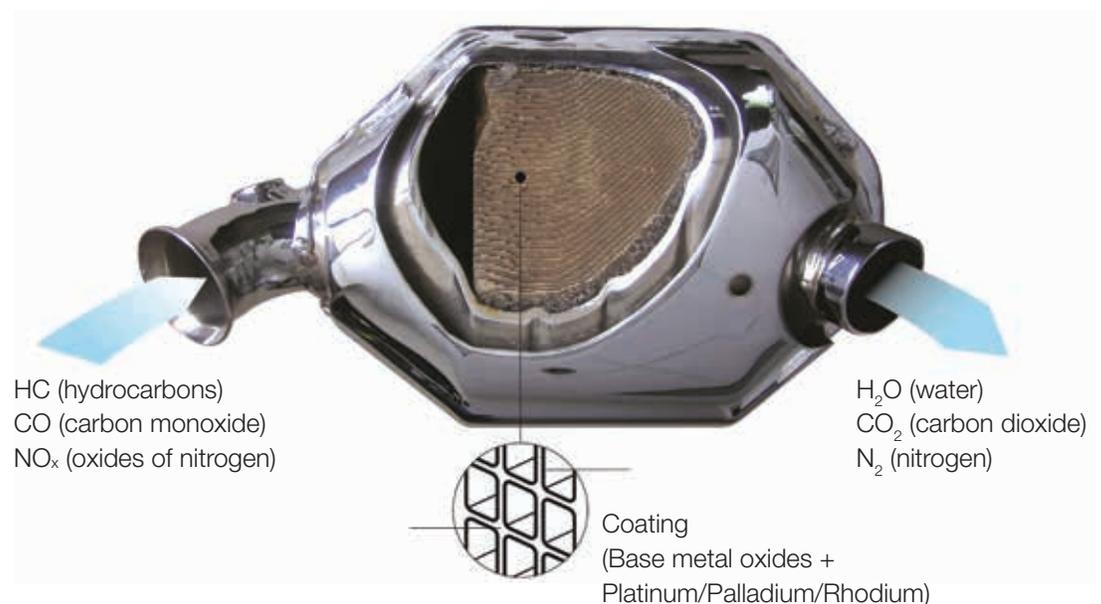


Figure 1: TWC operation

Emissions Control Catalysts

FWC™

FWC technology for gasoline engines. The traditional TWC used with gasoline-engines removes CO, HC and NO_x. However, new emission regulations such as Euro 6 and LEV III, also require particulate matter (PM) control.

Regulations Lower PM Limits

Upcoming Euro 6 regulations will include, in addition to the well-known limits for HC, CO and NO_x, tighter control of particulate matter emissions from gasoline-engine powered vehicles. The European Commission has decided to implement new standards for the maximum number of particulates in two phases:

- Phase 1 will start with an initial limit of $6 \times 10^{12}/\text{km}$ in 2014
- Phase 2 (Euro 6c) will tighten the limit to $6 \times 10^{11}/\text{km}$ in 2017

Particulate control approach

BASF has developed innovative FWC™ catalyst technologies that can be applied in a system, together with a standard TWC, as a CC (Close Couple) or UF (Under-Floor) or even as a FWC-only device for a fully integrated system.

Benefits

The innovative FWC™ catalyst combines the functionality of a TWC catalyst with a filter to remove all four pollutants with just one component. The benefits include:

- Smart solutions to lower backpressure impact
- Potential to reduce package design
- Ensure particulate emissions below tight regulation limits
- Reduction in system complexity, tooling and overall system cost

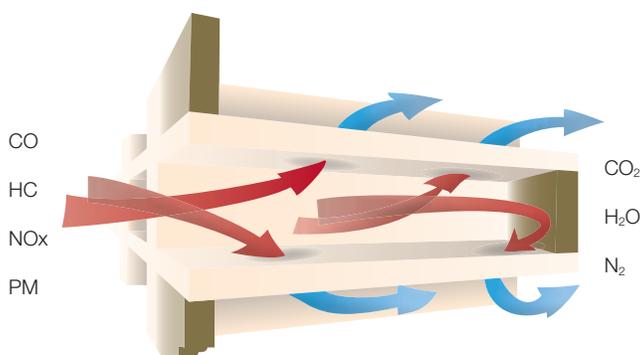


Figure 2: Principle of operation

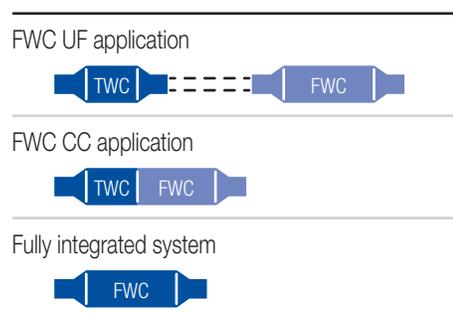


Figure 3: Comparison of various system configurations

Emissions Control Catalysts

PremAir®



Direct ozone reduction catalysts. PremAir is the first commercial product that destroys harmful, ground-level ozone already in the air and converts it into oxygen. PremAir catalysts have been successfully installed on over 3 million automotive radiators throughout the world.

Depending upon the conditions, PremAir can destroy 75 percent or more of the ozone that touches the PremAir-coated radiator surface, converting ozone molecules (O_3) into oxygen (O_2) molecules. There is no significant impact on cooling or other performance attributes of the radiator.

PremAir Credit Certified

Having recognized the air quality benefits of PremAir-equipped automotive radiators, the Air Resources Board in California has established programs to allow vehicle manufacturers to use PremAir in meeting emissions standards such as PZEV and SULEV. The US Tier 3 regulations also allow vehicle manufacturers to use PremAir. In addition, PremAir allows vehicle manufacturers to meet fleet average requirements of LEV III and Tier 3.

PremAir NXT Credit Certified

This innovation is designed for today's smaller vehicle radiators. It can achieve higher ozone conversion performance than the standard PremAir coating over the lifetime of the vehicle.

PremAir Green

Where regulatory compliance is not needed, PremAir Green is a cost-effective option for vehicle manufacturers to demonstrate commitment to a clean environment and a responsible environmental policy.

What is ground-level ozone?

According to the U.S. Environmental Protection Agency (EPA), in the Earth's lower atmosphere, near ground level, ozone is formed when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants and other sources react chemically in the presence of sunlight.

The American Lung Association reports that half of the U.S. population breathes unhealthy levels of ozone some time during the year. Millions of people living in urban areas around the world are similarly exposed.



Emissions Control Catalysts

EvapTrap™

Air Intake System Hydrocarbon Trap. EvapTrap is a patented innovative technology that is applied directly onto the surface of the air intake box to adsorb hydrocarbons without increasing backpressure. It can meet the LEV III SULEV (Super Ultra Low Emissions Vehicle) evaporative emission regulations while allowing use of the existing air intake box design.

The Air Resources Board of California has adopted the new LEV III emissions regulations which start in 2015. This will require all automakers to further reduce evaporative emissions. In fact, the SULEV standard specifies near zero evaporative emissions from the fuel system.

Air Intake System is a source of evaporative emissions

Hydrocarbons in the fuel from the engine can leak out through the air intake system when the car is not running. Traditional solutions involve adding an activated carbon honeycomb or filter to the air intake box to adsorb the hydrocarbons. However these increase the backpressure, reducing horsepower and fuel economy.

Hydrocarbon adsorption without adding backpressure

BASF has developed an innovative technology that adapts to any air intake design and enables designers to utilize the aerodynamics of the intake system for superior drivability. This solution does not add backpressure.

Performance advantages

EvapTrap offers significant value to automakers.

- Maximize hydrocarbon capacity for all types of fuels
- SHED tested
- Proven adhesion durability to all air intake box materials including polypropylene
- No increase in backpressure
- Tamper-proof coating
- Customizable with minimal engineering

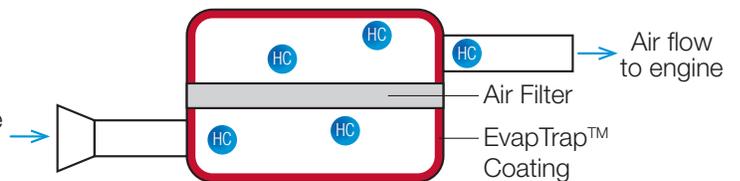


Example of Air Intake System part

Air Intake System with EvapTrap™

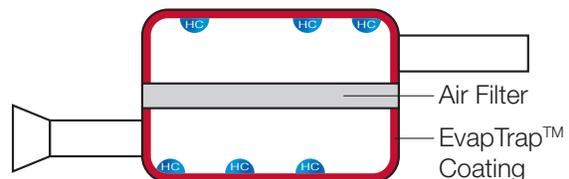
Engine start

Hydrocarbons (HC) are desorbed and combusted in engine



Engine off

Hydrocarbons (HC) are adsorbed by EvapTrap™



Emissions Control Catalysts

LGC

For Gasoline Direct Injection (GDI) engines. The patented BASF Lean GDI Catalyst technology provides the additional NO_x (nitrogen oxides) removal required from the exhaust of GDI engines.

GDI engines use lean combustion (excess of air) to deliver improved fuel economy. However NO_x exhaust emissions can increase and are a challenge to remove under these lean operating conditions. The Lean GDI catalyst is designed to operate under lean conditions and can be placed after the TWC catalyst to provide additional NO_x conversion.

Lean GDI Catalyst Technology

This technology combines three active components: Oxidation catalyst - platinum (Pt), Adsorbent - barium and/or other oxides, and Reduction catalyst - rhodium (Rh).

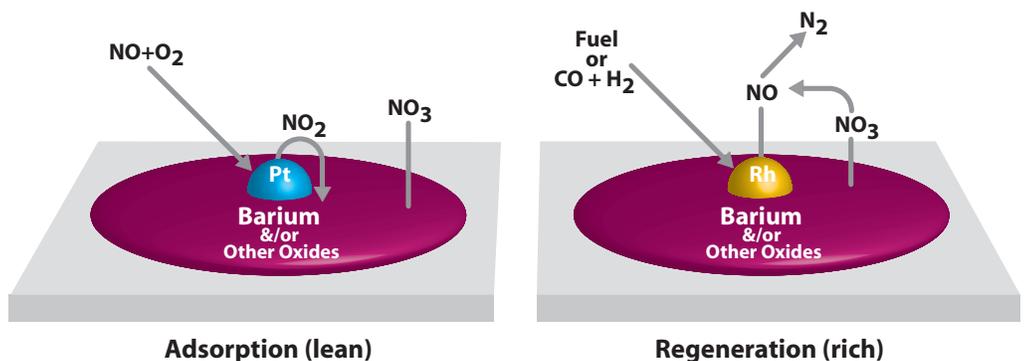
The adsorbers, which are incorporated into the catalyst washcoat, chemically bind NO_x during lean engine operation. When the adsorber capacity is saturated, the system is regenerated during a period of rich engine operation, and the released NO_x is reduced to nitrogen (N₂) over the catalyst.

Cycle of Operation

- NO reacts with oxygen on active oxidation catalyst sites to form NO₂.
- Adsorption of NO₂ by the storage material in the form of barium nitrate.
- Once exhaust is switched to the rich condition, oxygen is replaced by reducing species, including hydrocarbons, carbon monoxide (CO), and hydrogen (H₂).
- When the engine runs under excessive fuel conditions or at elevated temperatures the nitrate species become thermodynamically unstable and decompose, producing NO or NO₂.
- Under rich conditions, the nitrogen oxides are reduced to N₂ over the reduction catalyst.

Benefits

- Exceptionally high thermal stability.
- High NO_x removal activity at high temperature.
- High NO_x storage capacity.
- High NO_x reduction efficiency



Emissions Control Catalysts

Diesel Emissions Catalysts

Emissions from diesel engines are of increasing concern to government regulators around the world. BASF offers a broad range of diesel emissions control technologies. These components can be added together to create systems to meet strict emission requirements. We have the modeling capability to improve the performance of these systems.

DOC
(Diesel Oxidation Catalyst)

- Removes CO (carbon monoxide), HC (hydrocarbons), and some PM (particulate matter).
- Low light-off temperature
 - High sulfur tolerance
 - Platinum or Platinum-Palladium depending on application

CSF™
(Catalyzed Soot Filter)

- Traps PM and then uses a patented catalytic technology to help oxidize it.
- Stable NO₂/NO_x ratio
 - Higher passive regeneration
 - More efficient active regeneration

SCR
(Selective Catalytic Reduction)

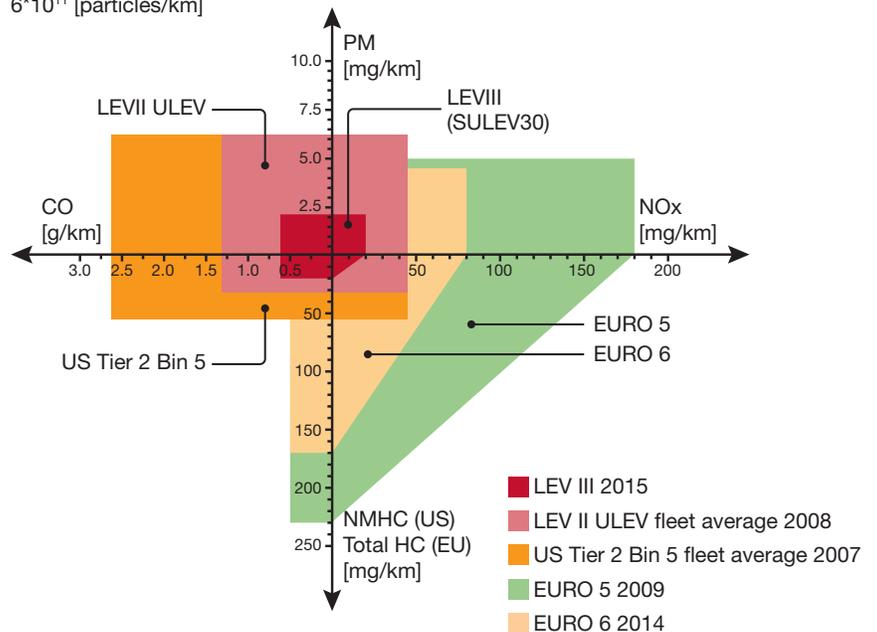
- Converts NO_x (nitrogen oxides) into water and nitrogen with the use of a urea solution (e.g. AdBlue® by BASF).
- Wide temperature range
 - Improved resistance to HC poisoning
 - Increased durability

AMX
(Ammonia Oxidation catalyst)

- Prevents ammonia from reaching the atmosphere.
- Can be zoned onto the SCR substrate
 - Also can be put on a separate substrate

Diesel Engine

Particle number limit for EU 5 and 6:
6*10¹¹ [particles/km]



LNT

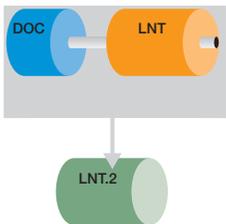
(Lean NO_x Trap)

Adsorbers chemically bind NO_x during lean engine operation. When the adsorber capacity is saturated, the system is regenerated during a period of rich engine operation, and the released NO_x is reduced to nitrogen over the catalyst.

- High NO_x removal activity
- Low light-off temperature
- Increased durability

LNT.2

(DOC and LNT)



This technology combines a DOC and LNT on one substrate. This component has the high HC and CO removal efficiency of a fully formulated DOC, with the ability of a LNT to trap and reduce NO_x.

Benefits

- Saves weight and space
- Reduces overall system cost

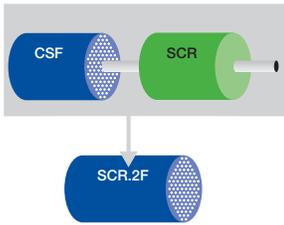


Emissions Control Catalysts

SCR Systems

In addition to putting together separate components to create systems, BASF has also developed solutions that combine multiple technologies on one component.

SCR.2F (SCR on Filter)

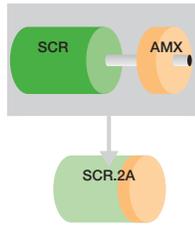


This patented technology combines SCR with a diesel particulate filter to control NO_x (nitrogen oxides) and PM (particulate matter) emissions from diesel engines on a single substrate.

Benefits

- Elimination of a substrate saves space, weight and overall system cost
- SCR moved to warmer location with similar performance to SCR and particulate filter on separate components
- Enabled by BASF's advanced zeolite SCR technology with superior durability

SCR.2A (SCR with AMX)

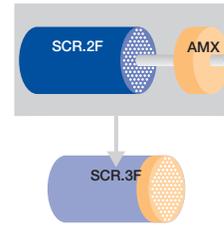


In this patented solution, BASF's ammonia oxidation technology is zoned on the SCR substrate to prevent ammonia from reaching the atmosphere.

Benefits

- Saves weight and space
- Reduces complexity and overall system cost

SCR.3F (SCR on Filter with AMX)



In this patented solution, BASF's ammonia oxidation technology is zoned on the SCR on Filter substrate to prevent ammonia from reaching the atmosphere.

Benefits

- Saves weight and space
- Reduces complexity and overall system cost



Emissions Control Catalysts

CSF Systems

During the desulfation of the LNT, hydrogen sulfide (H₂S) and/or ammonia (NH₃) are formed. The capability to prevent these pollutants from escaping to the atmosphere can be added to a CSF, saving weight and space.

CSF.2A

(CSF with NH₃ removal)



This solution has DOC/soot removal and ammonia removal.

ECSF.2H

(CSF with H₂S removal)

This solution offers DOC/soot removal and hydrogen sulfide removal.

Benefits

- DOC/soot removal
- H₂S and NH₃ control

CSF.3

(CSF with NH₃ & H₂S removal)



This solution provides DOC/soot removal plus ammonia and hydrogen sulfide removal.

Benefits

- DOC/soot removal
- H₂S control
- NH₃ control

CSF.4

(CSF with NO_x, NH₃ & H₂S removal)



This solution provides DOC/soot removal plus ammonia and hydrogen sulfide removal as well as additional NO_x removal.

Benefits

- DOC/soot removal
- H₂S control
- NH₃ control
- NO_x removal

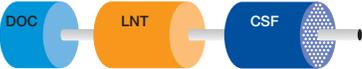
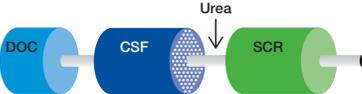


Emissions Control Catalysts

Solutions for Diesel

Light Duty Diesel. Compliance to strict emission limits, such as Euro 6, is a challenge for the emission system. The pollutants carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NO_x) need to be reduced as

well as soot (PM). Our mission is to deliver cost-effective solutions for these increasingly stringent emissions control regulations. Here are some examples.

System	Benefits
	<ul style="list-style-type: none"> No urea delivery and control system required, saving weight, space and cost
	<ul style="list-style-type: none"> Combining the DOC and LNT on one substrate saves weight and space No urea delivery and control system required, saving weight, space and cost CSF with added capability to remove H₂S & NH₃ formed during the desulfation of the LNT
	<ul style="list-style-type: none"> Combining the SCR and particulate filter on one substrate saves weight and space DOC designed for NO₂/NO_x ratio to achieve superior SCR activity Better NO_x conversion (higher exhaust temperature at new SCR location)
	<ul style="list-style-type: none"> No urea delivery and control system required, saving weight, space and cost Uses passive NH₃ from the LNT Reduced precious metal loading on the LNT
	<ul style="list-style-type: none"> Very high levels of NO_x conversion Suitable for larger displacement engines CSF designed for NO₂/NO_x ratio to achieve superior SCR activity

Improving fuel economy. To improve fuel economy, some OEMs are reducing EGR (exhaust gas recirculation) or retuning their light and heavy duty diesel engines which can increase NO_x. They use an SCR system with very high NO_x conversion to meet the emission regulations.

BASF pioneered SCR technology for stationary source emissions. Building on that expertise, we developed

SCR technologies with very high NO_x conversion to meet strict mobile emissions regulations around the globe. In addition to vanadium based technologies, we have patented zeolite SCR catalysts that offer high temperature stability.

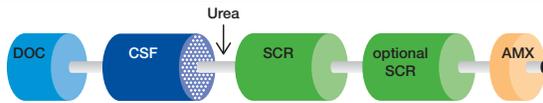
With BASF's strength in fundamental materials R&D and manufacturing capacity to produce high quality zeolites, we help make our customers more successful.

Emissions Control Catalysts

Heavy Duty Diesel. Heavy duty diesel on-road and off-road vehicles and equipment present unique challenges for emissions control. There are two general system approaches: active and passive. In an active system, fuel is periodically

injected into and combusted over the DOC to raise the temperature of the exhaust gas and burn off the soot in the filter. In a passive system, the DOC is formulated to generate NO_2 which is used to continuously remove soot from the filter.

Active System

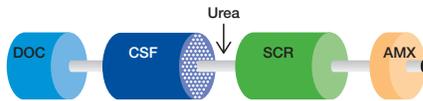


Benefits

- Very high levels of NO_x conversion
 - CSF designed for NO_2/NO_x ratio to achieve superior SCR activity
 - DOC designed to burn fuel and generate NO_2 to continuously remove soot from the filter
 - Superior durability enabled by BASF's advanced zeolite SCR
-
- Very high levels of NO_x conversion
 - Saves space; especially useful for off-road applications
 - DOC designed to burn fuel and generate NO_2/NO_x ratio to achieve superior SCR activity
 - Superior durability enabled by BASF's advanced zeolite SCR



Passive System



Benefits

- Very high levels of NO_x conversion
 - DOC designed to generate NO_2 to continuously remove soot from the filter
 - CSF designed for NO_2/NO_x ratio to achieve superior SCR activity
-
- Very high levels of NO_x conversion
 - DOC designed to generate NO_2/NO_x ratio to achieve superior SCR activity



Emissions Control Catalysts

NGC

Although gasoline and diesel fuels dominate the landscape today, there is growing interest in alternative fuels, especially natural gas to power vehicles. While alternative fuels often burn cleaner than gasoline or diesel fuel, they nonetheless produce emissions such as carbon monoxide (CO), nitrogen oxides (NO_x) and hydrocarbons (HC).

Proven solutions. For over a decade, BASF has offered the leading catalyst technology for natural gas vehicles (NGVs). We have solutions to meet strict emission regulations including Euro IV-VI, US2010 and Global Tier 4, and cover a broad range of natural gas engines.

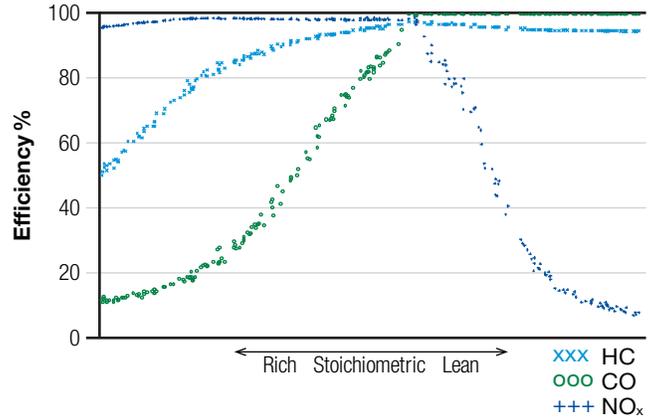


Figure 4: BASF natural gas catalyst

NGC.S (Stoichiometric)



Spark-ignition natural gas engines use NGC.S

NGC.L (Lean Burn)



Lean Burn natural gas engines typically use a system with NGC.L & optional SCR

NGC (Dual Fuel)



Dual Fuel natural gas/ diesel engines typically use a system with NGC & optional SCR

Emissions Control Catalysts

SEC



To meet emission regulations. BASF small engine catalysts are designed to cut pollution from two- and four-stroke engines that run on gasoline fuel. More than half of the hydrocarbon and carbon monoxide emissions from these engines can be eliminated in most applications.

Small, two- and four-stroke engines contribute significantly to air pollution. In response, governments are implementing emission regulations to improve air quality. For the specifics on these standards, visit: www.meca.org. BASF catalysts can help to cost-effectively meet these regulations.

Applications

We have solutions for a wide range of small engine emission control applications, including:

- Lawn mowers
- Leaf blowers
- Stone cutters
- Trimmers
- Chain saws
- Portable generators, and more

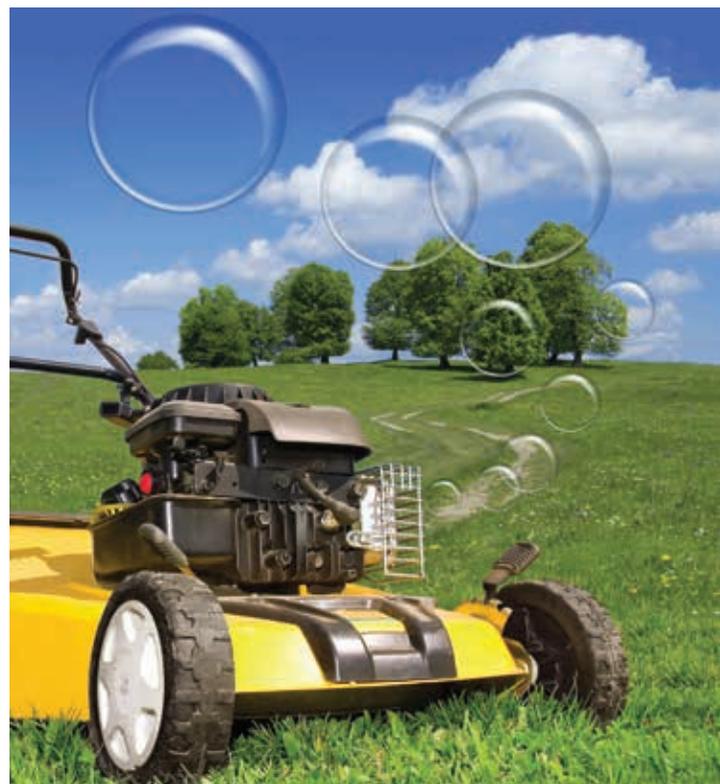
Benefits

- Stable performance
- Low deterioration factor
- Maintenance of light-off characteristics

Full range of capabilities

BASF offers a full range of exhaust after-treatment capabilities for cost effective emissions compliance.

This includes in-house design and manufacture of metallic substrates, a full range of Applications Engineering and Development capabilities, engine testing & catalyst screening services, enhanced local supply chain for short lead times, and world class customer service.



Emissions Control Catalysts

MCY

BASF catalyst technologies, leveraging advanced materials and novel architectural designs, can meet motorcycle Euro 3 emission standards with low precious metal content, even for carbureted engines.

Carbureted motorcycle engines with broad air/fuel excursions can be challenging to bring into compliance with Euro 3 emission standards. Advanced catalyst technology from BASF offers a cost-effective approach to meet this challenge.

A carbureted motorcycle emissions system can consist of two catalysts: a front catalyst is placed near the engine to enhance light-off and reduce cold-start emissions, while a rear catalyst is located further downstream in the exhaust system to convert remaining pollutants.

Benefits

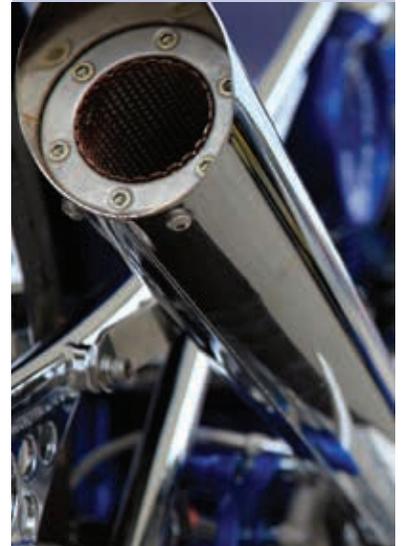
- Cost-effective use of specially engineered precious metal packages
- Strong performance under varying air/fuel conditions

Full range of capabilities

BASF offers a full range of exhaust after-treatment capabilities for cost-effective emissions compliance with Euro 3 & 4, US Tier 2, and other regulations. This includes in-house design and manufacture of metallic substrates, a full range of Applications Engineering and Development capabilities, vehicle testing and catalyst screening services, enhanced local supply chain for short lead times, and world class customer service.



Integrated motorcycle catalyst coating on metallic substrate



Emissions Control Catalysts

BASF - Mobile Emissions Catalysts Market Leader

Key factors:

- **Technology leadership** – fundamental materials R&D with robust pipeline of new technologies
- **Proximity to the customer** – local manufacturing, technical services and R&D presence, especially in emerging regions
- **Investing and expanding** – to meet the needs of our customers and enable clean air for all; supply chain integration for key raw materials, such as zeolites for SCR
- **Our people** – innovating to make our customers more successful
- **Leveraging BASF’s automotive solutions** – excellent customer relations in global automotive markets

Precious metals services

As a world leader with decades of experience with Platinum Group Metals (PGMs), BASF offers “full loop” services that include:

- Design and implementation of metal pricing and supply chain management programs
- Distinctive perspective into PGM supply and demand fundamentals for strategic pricing decisions
- Refinement of spent catalyst
- 24/7 access to world metals exchanges and key bullion centers
- Global trading offices



Solutions for the most challenging applications



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.

Visit www.catalysts.basf.com/patents for a list of our product patents.

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About BASF's automotive solutions

The automotive industry is one of BASF's key customer industries, accounting for up to 15 percent of the Group's total sales. As the world's leading automotive supplier in the chemical industry, BASF is recognized as a reliable and competent partner by carmakers, suppliers, and the after-sales market. With a strong presence in Europe, Africa, North and South America, as well as in Asia, BASF has a global industry network. It supplies and develops functional materials and solutions that contribute to the vehicles of today and of the future. From engineering plastics, polyurethane and specialty foams, coatings and fuel additives to catalysts, battery materials, pigments, synthetic lubricants, coolants, brake fluids and chemicals for leather and textiles, BASF supplies a broad range of products for use in the automotive industry. Visit www.automotive.basf.com for more information.

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To learn more, scan the QR code or visit
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