

History of Environmental and Climate Innovation

1960s

BASF's DeNOx catalysts (O4-80) are the first used in HNO₃ plants.

1980s

BASF DeNOx catalyst development (honeycombs) for use in various applications, including power plants and nitric acid plants.

1990s

N₂O decomposition catalyst development to reduce significant N₂O emissions from adipic acid plants. Further improvements of BASF's DeNOx catalyst portfolio with O4-81 for low-temperature applications. Introduction of N₂O catalysts to reduce N₂O emissions from HNO₃ plants.

2000s

Ongoing N₂O decomposition technology development. Optimization and development of special honeycomb catalysts. Introduction of O4-89 to replace O4-80 and O4-81 as the sole solution.

2007

BASF is awarded the "Responsible Care Prize" (Belgian chemical industry).



We create chemistry



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Americas

BASF Corporation
Phone: +1-732-205-5000
Email: catalysts-america@basf.com

Asia Pacific

BASF (China) Company Limited
Phone: +86-21-2039-1311
Email: catalysts-asia@basf.com

Europe, Middle East, Africa

BASF Services Europe GmbH
Phone: +49-30-2005-5000
Email: catalysts-europe@basf.com



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 – We create chemistry

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www.catalysts.basf.com/environmental-catalysts

Do you want to contribute to sustainable growth?

BASF N₂O decomposition and DeNOx technologies improve your processes ecologically and economically.



Environmental Catalysts

BASF's globally operating Environmental Catalysts Group supplies catalysts and technologies to reduce emissions from stationary sources and industrial processes. Tailor-made solutions, catalyst services and long-term experience in emission reduction help our customers fulfill their sustainability goals.

Nitric acid (HNO₃) production involves the oxidation of ammonia (NH₃), which has the effects of generating nitrous oxide (N₂O) and other nitrogen oxide (NOx) emissions. Nitrogen oxides are considered one of the major causes of acid rain. Nitrous oxide or laughing gas, the impact of which is 298 times greater than carbon dioxide (CO₂), has been identified as a greenhouse gas by the Kyoto Protocol.

In response to the increasing concerns about the environment and the global drive for ever-tightening emissions regulations, BASF has been working for years to develop and continuously refine an innovative portfolio of abatement catalysts. Today, BASF Catalysts offers a complete portfolio of environmental catalysts that eliminate and reduce these harmful substances not only in its own plants, but also at customers' sites worldwide.

N₂O Decomposition Technology

BASF's N₂O decomposition technology adsorbs N₂O (laughing gas) and almost eliminates N₂O emissions. The decomposition of 1 metric ton of N₂O has the same effect as of saving 298 metric tons of CO₂ emissions. To break N₂O down into its harmless, natural components (N₂ and O₂), BASF has developed a series of decomposition catalysts. Because it does not emit any additional compounds into the atmosphere, the N₂O decomposition technology has proven valuable for both nitric acid and adipic acid plants. Initially only used in BASF plants, the methodology has been developed and optimized for third-party plants around the globe.



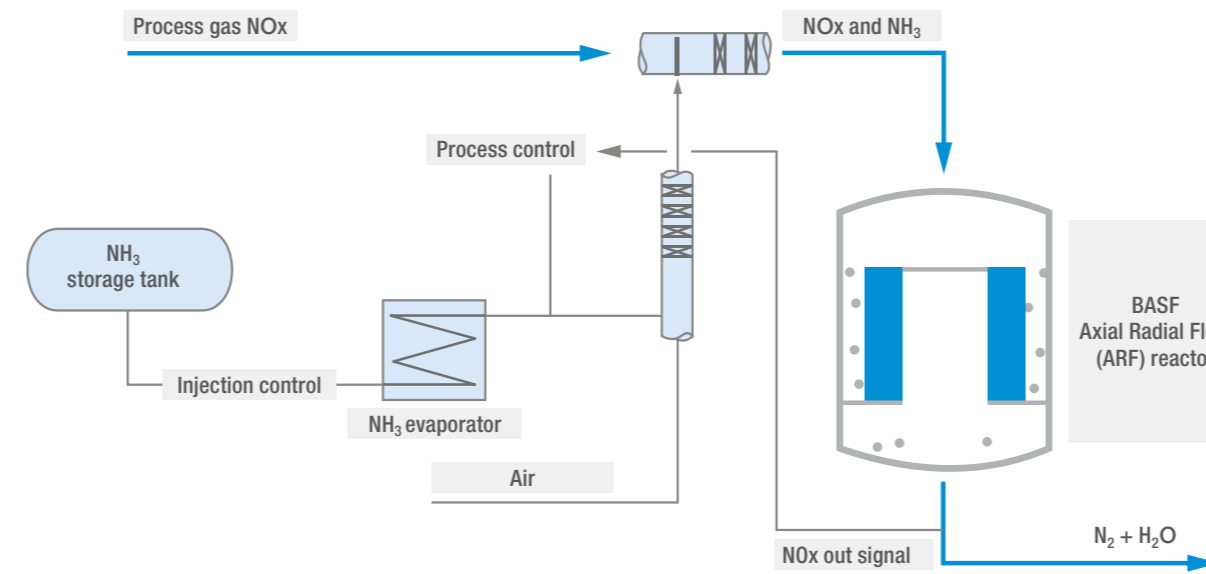
Catalyst	Shape	Size, mm	Density, kg/L	Min. Operating Temperature, °C	Max. Operating Temperature, °C
O3-81	Star extrudates	6 (diameter)	0.9	450	>800
O3-85	Star extrudates	3, 6 (diameter)	0.9–1.0	750	>900
O4-89	Extrudates	4.5 (diameter)	1.1	180	450

Your Benefits:

- Long catalytic lifetime
- Durability saves up to 50%
- No leaching into the HNO₃
- Works with all types of platinum (Pt) gauzes
- Extremely low pressure drop
- Good economic value with low investment

Our Service:

- Full catalyst design based on process simulation
- Activity tests
- Confidentiality license agreement
- Supply of fresh catalyst



“Selective” refers to the ability of the NH₃ to react directly with the NO instead of being oxidized by air. The use of BASF's SCR DeNOx catalyst in the tailgas reduces the amount of NH₃ slip.

DeNOx Technology

BASF offers catalysts for the selective catalytic reduction of NOx (DeNOx) from stationary source gases. This process enables the elimination of pollutants without producing any residues which require disposal. Using a vanadium pentoxide (V₂O₅) catalyst on a titanium dioxide (TiO₂) carrier, the denitrification process is employed in the tail end of the HNO₃ plants. Precise injection of NH₃ combined with the BASF's superior, high-porosity catalyst causes the conversion of nitrogen oxides into N₂ and H₂O.

Your Benefits:

- Extremely low NH₃ slip
- No substantial N₂O generation
- Low pressure drop combined with optimized fluid dynamics
- Flexibility – covers all relevant operating windows
- Cost-effective solution

Our Service:

- Refills
- Revamps
- New plants together with our engineering partner

Developed To Be Selective: O4-89

The BASF O4-89 catalyst allows installation within a wide temperature (180–450°C) and pressure (3–12 bar) range. For lower to ambient pressures, the BASF O4-82 catalyst – a monolith concept – is the preferred choice.

Physical Properties of O4-89

Color: brown-yellow / geometry: extrudate / diameter, mm: approx. 4.5 / active composition V₂O₅ on metal oxide carrier / load density, kg/L approx. 1,100 / crush strength, kg approx. 4 / abrasion, %: < 10

