Breakthrough catalytic filters trap dust, while removing NOx, dioxins, CO and VOCs

Remove gas emissions and dust in one single process

TopFrax™ catalytic filters

www.topsoe.com
Are regulators putting the squeeze on your business?

Topsoe’s new TopFrax™ catalytic filter makes compliance a whole lot more affordable

 Authorities in many countries are tightening emissions standards by reducing particle permissible levels and adding new gases to the list of regulated components. Compliance is costly, requiring substantial investments in new abatement technologies.

At Topsoe, we hear producers calling not just for new technologies, but for innovation that makes compliance affordable. That’s what our TopFrax™ catalytic filter is all about.

**Trap dust and remove pollutants**

TopFrax™ are patent-pending catalyst-coated filters designed to treat off-gases in high-dust environments found in a wide range of industries and activities, including:

- Glass production
- Cement production
- Waste incineration
- Bio-mass boilers
- Steel production

Built on decades of leadership in filtration and catalysis, these breakthrough solutions can transform the economics of meeting regulatory emissions.

The fact that we both master catalysts and process technology gives us the “big picture” view it takes to ensure optimal performance.
Remove gas emissions and dust in one single process

Upgrading is easy and affordable, if you use a candle system

Topsoe’s catalytic filter is designed to give any facility the option of treating off-gases along with trapping dust. TopFrax™ is a catalytic ceramic candle solution that provides high removal performance efficiency at both high and low operating temperatures and with the resistance of sparks contained in off-gases.

**TopFrax™ catalytic filter candle**

The TopFrax™ catalytic filter candle consists of a high-temperature-resistant ceramic filter impregnated with carefully selected catalytic compounds. Benefits include:

- Simultaneous dust and multiple gaseous compounds removal in a single step
- No need for costly, space-demanding tail-end gas removal equipment
- Reinforced at flanges and bottom to enhance mechanical durability
- Catalytic ceramic filter accommodates temperatures as high as 400°C (752°F)
- No contact between catalyst and potentially harmful particles
- Exceptional resistance to catalyst poisoning
- Effective down to 180°C (356°F) operation
- Easy to install and handle
TopFrax™ catalytic filters
A broad spectrum of regulated pollutants

While the filters trap dust, the catalyst removes NOx, dioxins, CO and VOC
Dust
TopFrax™ effectively blocks particulates and dust particles at the filter surface the same way conventional filters do, ensuring full compliance with stringent emission standards.

TopFrax™ candles are made from either refractory ceramics or fibers with low bio-persistance. Both products trap dust emissions (below PM$_{1.0}$) down to 1 mg/Nm$^3$.

NOx
TopFrax™ uses selective catalytic reduction (SCR) to remove NOx from off-gases, by utilizing ammonia to convert to harmless nitrogen and water.

Dioxins
TopFrax™ also ensures compliance with limits on dioxins and furans, by treating more than 99% of these by converting them into harmless compounds and reducing their concentrations to below 0.1 ng/Nm$^3$, TEQ.

CO and VOCs
The catalytic sites on TopFrax™ candles also oxidize CO and volatile organic compounds into harmless CO$_2$ and H$_2$O.

The TopFrax™ oxidation version ensures optimal combustion of VOCs with no additional emission of CO.
Cut technology costs

The Topsoe catalytic filter solution TopFrax™ can help you reduce capital expenditures compared to competing solutions relying on separate DeNOx and oxidation technologies.
Filtration unit and tail end removal of NOx and VOC

Traditional solution based on separated technologies

Catalytic filtration - integrated solution

Catalytic filter solution:

- Lower CAPEX
- Less foot print
- Lower pressure drop
- Less maintenance
- Lower cost of ownership

Comparison of lump sum investment

CAPEX savings from installing catalytic filters.

Comparison of lump sum investment:

- Filter house + filters
- Electrostatic precipitator + catalytic reactor
- Duct

Diagram showing:
- Raw gas
- PM, CO, NOx, VOCs, Dioxins
- Electrostatic precipitator
- Selective Catalytic Reduction
- Oxidation catalyst
- Clean gas to stack

Diagram showing:
- TopFrax™ catalytic filters
- PM removal + DeNOx + VOC removal
- Clean gas to stack
Optimized performance often means ensuring that multiple technologies and components are tuned to each other. If you’re not already using them, please consider these related offerings from Topsoe.

VOC removal
Regulatory pressure on VOC emissions has never been greater, and we can help you meet the challenge by removing VOCs from off-gases via low-temperature catalytic processes. Our solutions deliver reduction efficiencies exceeding 99%, without creating any secondary pollutants. Our catalysts remove VOCs from air and waste gas streams in an energy-efficient and environmentally friendly manner.

Sulfur removal
As emission regulations continue to get tighter around the world, optimal handling of sulfurous gases is becoming increasingly important. In addition to meeting regulatory requirements, we make sure our solutions also make financial sense. Due to their high availability, energy efficiency and flexibility, our sulfur removal systems deliver market-leading performance. They can even be used to convert otherwise costly waste into valuable commercial-grade sulfuric acid.

Related technologies
Discover the full range of Topsoe catalysts and technologies for optimizing performance.
Why partner with Haldor Topsoe

The Topsoe advantage lies not just in individual solutions, but in how our solutions work together.

When you partner with Haldor Topsoe, you partner not only with the world’s experts in catalysis, surface science and emissions management. You also partner with a company that takes a uniquely holistic approach to your plant and your business.

When we look at your plant, we look at the big picture – and then apply the full breadth of our expertise to deliver a thoroughly tailored solution, where individual components work together to ensure environmental compliance at the lowest possible cost.
Haldor Topsoe is a world leader in catalysis and surface science, committed to helping our customers achieve optimal performance. We enable companies to get the most out of their processes and products, using the least possible energy and resources, in the most responsible way. We are headquartered in Denmark and do project development, R&D, engineering, production, and sales & service across the globe.