Reduce plant emissions
Cleaner solutions

One source
FLSmidth’s air pollution control (APC) technology includes a wide range of solutions to reduce particulate matter and gaseous emissions.

With more than 8,000 systems installed worldwide, we are your one source for cleaner performance in projects big and small. Nobody knows more about APC than FLSmidth.

Technology and cost leadership
We have the experience and innovative technology to help your plant comply with environmental regulations, now and in the future. From project development to after-sale services, FLSmidth delivers excellence in APC.

FLSmidth® solutions include:
- Particulate removal technologies, such as ESP and fabric filter
- SOx and HCl reduction technology
- Catalytic technology for combined particle and gas removal
- THC/VOC reduction technology
- Heavy metal reduction technology, including mercury
- Dioxin reduction technology
- Low NOx technology

FLSmidth leads the way in environmental protection, in part through a dedicated commitment to R&D that ensures cutting-edge technology and an exceptional product portfolio. Optimised product manufacturing, fabrication and installation make our guaranteed APC solutions efficient and reliable. And in terms of total cost of ownership, they are among the industry’s most economical.
**Emissions guarantees**
We are not satisfied until you are, which is why we give you performance guarantees based on a precise assessment of your plant and on the data and experience collected from more than 8,000 systems delivered.

For new APC equipment, we utilise the latest in computational fluid dynamics-based (CFD) predictive modelling software to estimate the actual levels that will be achieved once the plant is operating at full capacity.

For existing APC equipment, we measure current emissions and make recommendations on how to improve the current solution.

Our range of technology and high level of expertise allows you to select the ideal emissions solution option for your plant:
- **Rebuild** – refurbish equipment back to original condition and capacity
- **Upgrade** – install modern components to existing APC equipment for improved performance and reliability
- **Convert** – reuse existing APC equipment housing to adapt a new design
- **Replace** – build a new unit alongside and shut down only to reroute ducting

FLSmidth’s capabilities encompass the complete range of air pollution control challenges:
- Designing, building and installing APC solutions – standard or custom solutions
- Specialising in ESP, fabric filter, hybrid solutions and gas suspension absorber (GSA) technology
- Delivering turnkey solutions, full-scope delivery or key parts according to your need
- Meeting and exceeding environmental regulations
- Troubleshooting and problem solving
- Utilizing an efficient global network to source, supply and produce the best products at the best price

**Guaranteed cleaner performance**
We are committed to understanding and anticipating your needs by making the industry’s foremost experts available to deliver engineering excellence and superior support.

**Cleaner technology**
Exceptional product portfolio and constant technological innovation through R&D investments.

**Cleaner competence**
We are experts in the field of APC offering exceptional capability at every stage, from individual equipment to turnkey solutions.

**Cleaner solutions**
We partner with you in a close cooperation to deliver tailored solutions designed for your plant ... and we stay until the job is done.

**Industries served**
Our extensive process knowledge enables us to design the right configuration to your industry-specific application in:
- Cement
- Lime
- Pulp & Paper
- Iron & Steel
- Copper
- Alumina and bauxite
- Nickel

**Did you know?**
FLSmidth’s full scale R&D Centre Dania, Denmark, is the largest R&D facility in the industry. In regards to air pollution control extensive R&D is conducted to improve technology and design to achieve the highest possible pollutant removal efficiency while improving system lifetime and reliability.
Unique features
Whether FLSmidth provides the entire system design from ventilation point to the outlet stack or simply provides the design and key parts of the fabric filter, we will work with you to find the most cost-effective solution.

Highlights of our fabric filter technology include FLSmidth’s sophisticated gas and dust distribution system, perfect bag-to-cage match and the convenience of on-line maintenance. Our fabric filter design focuses on long bag lifetime, minimal maintenance and reliable, cost-effective operation, all aimed at providing you with a dependable, long-term solution.

Unique features of FLSmidth fabric filters include:
- **Unique gas distribution screens** - provide optimized gas distribution
- **Advanced control system** – the Smart Pulse Controller® ensures efficient operation and increases filter lifetime
- **Long filter bag technology** – results in smaller equipment footprint and reduces overall maintenance costs
- **Proprietary cage design** – the star-shaped cage design improves bag lifetime by minimizing abrasion
**Long lifetime and reduced operation costs**

The proprietary cage design provides fewer bag-to-cage contact points, thus filter bag lifetime is increased and flex fatigue is reduced. Long filter bag technology contributes to low operating and maintenance costs, as the number of bags and cages are minimized.

The unique gas distribution system, in combination with pre-separation of dust, means that there is less dust load on bags resulting in fewer cleaning cycles and minimizing compressed air consumption. The Smart Pulse Controller® automatically adjusts pulse duration, interval and pressure, which further minimises the use of compressed air.

**Extensive R&D**

To help you meet increasingly stringent environmental requirements, we are continually pushing the limits of what our fabric filters can achieve. This includes efficient operation and increased life of the filter bag, which ultimately results in significant energy savings and lowest total cost of ownership.

FLSmidth’s extensive R&D work on improving manufacturing and construction processes has resulted in new filter types that provide reduced equipment weight and footprint without compromising emission reduction capabilities. These new filter types minimize construction time and shipping cost, which lead to reduced investment and lower operating cost.

**Did you know?**

FLSmidth manufactures AFT™ filter bags in a broad range of filter media. We have production facilities working non-stop to enable fast supply of high-quality filter bags all over the world.

FLSmidth supplies filters in standard design as well as highly customised solutions.

**FLSmidth fabric filter key benefits**

- Increased efficiency with pre-separation of dust
- Smaller equipment footprint
- Long filter bag life
- Reduced energy consumption
- Lowest total cost of ownership
- Minimal maintenance

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Increased efficiency
FLSmidth® electrostatic precipitators (ESPs) can match fabric filters in efficiency, delivering reliable dust emission control down to 5mg/Nm³.

We have installed more than 4,000 ESPs in a wide range of industries and applications, and we offer tailored solutions to meet specific plant requirements.

Technology leadership
We are continuously developing the design and the technology of our ESPs to meet increasingly stringent emissions requirements through optimal gas distribution, greater particulate capture and reduced energy consumption.

Features that distinguish FLSmidth’s ESPs from the competition include:
- Proprietary power supply system (Coromax®) – ensures energy savings, increased efficiency and reduced emissions
- Computational Fluid Dynamics (CFD) – modelling for optimal gas and dust distribution, enabling 100% utilization of installed collection area and a reduced equipment footprint
- Proprietary microprocessor controls (PIACS®) – enable ESP to react efficiently to process variations, ensuring outlet emissions remain low even under challenging conditions
- Unique electrode design for specific process and operating conditions – maximises utilization of power input and increases efficiency

Electrostatic precipitators
Trouble-free operation
Due to high quality, flexible design and long process experience, FLSmidth’s ESPs minimise wear and tear and require only minimal maintenance. Wear parts are placed outside the dust-stream, facilitating trouble-free operation and easy access to the parts.

Understanding your process
With thousands of precipitators installed in a variety of industries around the world, we have the experience to understand your particular process requirements – to design the best ESP configuration and specification of internal components and achieve the most stringent guaranteed emissions level for your plant.

Upgrade your ESP to Hybrid filter
A hybrid filter might be the right APC solution for your plant as an upgrade of your existing ESP. In a hybrid filter, one part of your ESP continues to function as an ESP while the remaining part of the filter is modified to function as a fabric filter. The ESP section collects a majority of the dust, including the large particles, while the fabric filter section removes the fine particles. This way, the hybrid filter ensures optimum particulate removal efficiency at all times and is also less expensive to install than a new fabric filter and has lower operating costs.

Hybrid filters offer many advantages, including efficient particulate removal and low installation and operating costs.

FLSmidth ESP key benefits
- Increased particulate capture
- Reduced energy consumption
- 100% utilization of collection area
- Minimal equipment footprint
- Reduced installation and operating costs
- Minimal maintenance

Did you know?
All parts of the ESPs rapping system are lifetime tested by 1.000.000 strokes corresponding to 20 years of operation.
Multi-pollutant control

FLSmidth’s gas suspension absorber, FLS-GSA® provides a high level of SO₂ and HCl removal, as well as a high level of mercury (Hg) removal for both species of mercury.

The gas suspension absorber’s modular design enables fast, flexible installation, with very little disruption to plant operation. FLSmidth has completed more than 70 gas suspension absorber installations worldwide.

The FLS-GSA can be installed rapidly at low initial cost and is economical to operate.
Highly efficient
The FLS-GSA® gas suspension absorber is an efficient, versatile multi-pollutant control device that can be delivered and installed in a short time at low initial cost. Because it re-circulates the absorbent to a very high degree, the high absorbent utilisation is high, keeping the operating cost at a minimum. Additionally, the reactor volume is small and requires limited ground space.

A combination of features makes the FLS-GSA® gas suspension absorber an extremely efficient system:
- **Low sorbent consumption** – keeping operating cost at a minimum
- **High removal of multiple pollutants** – ensures compliance with the most stringent emission regulations
- **Modular design** – offers great flexibility in delivery and installation
- **Modest space requirement** – small footprint makes the FLS-GSA easy to fit into existing plant layout
- **Fast and simple installation** – minimises installation time and expense
- **Few moving parts** – increases reliability and minimises maintenance

Easy to maintain
Compared to alternative solutions, the gas suspension absorber is easy to maintain. It uses a minimum of wear parts which is a key factor in controlling cost and keeping availability high. For instance, nozzle replacement (the only part that requires regular maintenance) can be performed without disrupting plant operation. The replacement process is a one-person job that takes just a few minutes and follows a simple procedure prompted by the control system – while flue gas cleaning continues uninterrupted.

Long-term compliance
The gas suspension absorber is designed to comply with extremely low emissions standards. It can help you meet increasingly stringent environmental regulations well into the future.

**FLS-GSA® key benefits**
- High level of SO₂ and HCl removal
- High level of Hg, dioxins/furans removal
- Intense re-circulation of absorbent keeps lime consumption low
- Automatic monitoring and easy maintenance reduces operating costs
- Fast, simple installation
- Low initial investment
- NESHAP regulation compliance

FLSmidth has provided Gas Suspension Absorber technology for multi-pollutant flue gas control for more than 20 years.

**Did you know?**
The FLS-GSA® gas suspension absorber removes up to 97% SO₂, 99% HCl, and 80-90% Hg – and with activated carbon injection even more Hg.
Maintain and improve
With more than 70 years of experience in APC customer services, no one is better equipped than FLSmidth to help you maintain and improve your APC equipment.

We can help you maximise uptime, improve efficiency, save energy and meet emissions requirements by ensuring that each component functions efficiently as part of the total system.

One source, many capabilities
FLSmidth excels in APC equipment and is a complete solutions supplier – including after-sales service and support to ensure optimum performance throughout the life of your equipment.

We are your One Source partner for:
- New products
- Upgrade projects
- Maintenance service
- Installation, consultation and supervision
- Spare parts
- Training and seminars

Global support
Our global organisation – including a strong local presence in more than 50 countries – enables us to help keep your APC equipment in top operating condition throughout its lifetime. We offer field emergency services to provide rapid assistance whenever you need it.

Serving customers
Serving
Inspections and preventive maintenance
We understand the importance of ensuring that your plant experiences optimum plant efficiency and minimum downtime. An inspection includes everything from recommendations for minor adjustments to long-term investment plans. Our customer service solutions focus on preventive maintenance to help avoid expensive, unforeseen stops.

Training and seminars
Our extensive knowledge of air pollution control equipment is based on decades of experience, and we are ready to share it with you. We offer a variety of standard training courses and customised seminars covering all areas of keeping your plant running cost-effectively.

Parts replacement and upgrades
FLSmidth offers a variety of improvement options for your existing APC equipment. We support and supply parts for all types of equipment – also systems that have been in operation in more than 30 years. We also provide recommendations for upgrading and maintenance of existing equipment.

One source for APC support and spare parts
We are committed to supplying every spare part or service you require during the complete lifecycle of your air pollution control equipment.

FLSmidth offers
- High-quality spare parts
- Extensive support solutions covering your specific need
- Specifically designed replacements for your FLSmidth equipment
- Replacements for other OEMs’ APC equipment
- Ability to convert and upgrade to ensure compliance with regulations

Process expertise
Our know-how can be one of your most valuable resources. It made the difference when a customer’s ESP installation was having problems complying with the emission permit. Our specialists discovered that the rapping system was not functioning well. We recommended a solution for modifying the existing system and for correcting the gas distribution, which brought the installation back into compliance.

Rapid response
A fast response to unexpected issues is just one way we help you achieve maximum uptime. For example, after overheating a portion of filter bags during the weekend, a cement manufacturer called FLSmidth’s filter bag manufacturer, AFT, for help. Less than 24 hours after the first contact the right amount of bags were produced and air freighted overnight that the customer was up and running by lunchtime the next day.

Close relationships
We support you throughout the lifetime of your equipment. One of our long-standing customer relationships began with the supply of an APC system. This bond was strengthened by regular service visits and yearly maintenance. For another customer, we helped with upgrades of existing FLSmidth and non-FLSmidth equipment to ensure a continuing improvement in emission control capability. Upgrades like these can be planned in stages to match your investment plans.

The right solution for your plant
We specialise in customised APC solutions. To discuss the best approach for your plant, please call your FLSmidth representative. Or to request a call from one of our APC specialists, visit www.flsmidth.com/apc