GROUPE BOËT

COMPLETE EXHAUST LINE

EMISSION & NOISE CONTROL SOLUTIONS

APPLICATIONS

POWER GENERATION – INDUSTRIAL PLANTS – MARINE & OFFSHORE – DATA CENTERS

Comprehensive control of harmful emissions:

- Pollutant: NOx, CO, PN, PM
- Noise
- Vibrations

Up to 98% NOx reduction

Noise attenuation up to 60 dB

Optimized pressure drop

Plug-and-Play system

A global challenge with multiple interactions

A combustion engine generates multiple forms of exhaust-related disturbances: sound pressure levels that can exceed 130 dB, and atmospheric pollutants harmful to health and the environment such as nitrogen oxides (NOx), carbon monoxide (CO), unburnt hydrocarbons (HC) and fine particulate matter (PM). These are combined with thermal, vibratory and pulsating stresses that can weaken equipment if not properly engineered.

These phenomena cannot be considered independently, as they continuously interact. Exhaust valve openings create pressure waves at the engine's operating frequencies and their harmonics. These waves may coincide with the acoustic modes of the exhaust line, the structural vibration modes, or both simultaneously. Such coincidences can amplify mechanical stresses and sound levels, reducing the system's reliability and service life. Acoustics are also directly impacted by these interactions. Emission-control components behave reactively at low frequencies and resistively at mid and high frequencies. However, this effect is not always beneficial: some frequency bands are attenuated, while others may be amplified.

Pressure drop adds another layer of interaction. Each component of the exhaust line affects the gas flow, preventing it from stabilizing before reaching the next element. Total pressure loss is therefore not a simple sum of individual components—it results from a global system effect that must be analyzed as a whole.

Given this complexity, a system-level engineering approach is essential. Designing the exhaust line as an integrated system ensures compliance with the most stringent regulations, enhances equipment durability and reliability, preserves your company's reputation and competitiveness, and contributes directly to the energy transition.

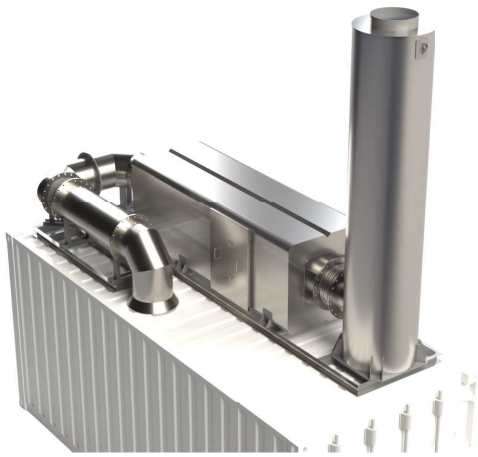
Our solution: the complete exhaust line

A fully integrated solution designed to control all emission, noise and vibration impacts

To address the combined challenges of noise, pollutant emissions and vibration, Groupe Boët offers complete exhaust line systems designed to manage all these phenomena and their interactions simultaneously

This integrated solution enables:

- Reduction of all pollutants (NOx, CO, PM, PN) through fully integrated emission-control systems, with NOx reduction levels of up to 98% using SCR.
- Noise attenuation up to 60 dB thanks to an optimized silencer design.
- Effective management of vibrations and thermal expansion, protecting equipment and extending service life.
- Full control of interactions between all phenomena, minimizing adverse effects and ensuring stable engine performance.



Manufactured in carbon steel or stainless steel, these assemblies are robust, modular and fully plug-and-play, reducing footprint while simplifying both installation and maintenance.

Designed for gensets, industrial power plants, data centers and marine applications, this integrated approach provides two key strategic advantages:

- Compliance with the strictest standards and a significant reduction in environmental impact
- Enhanced durability, reliability and operational continuity

Key components of a complete exhaust system

01. Pollutant Reduction

NOx (nitrogen oxides)

Catalysts:

- **SCR** (Selective Catalytic Reduction): converts NOx into nitrogen (N_2) and water vapor (H_2O).
- **DOC** (Diesel Oxidation Catalyst) – optional: partial oxidation of pollutants to enhance SCR efficiency.
- **ASC** (Ammonia Slip Catalyst) – optional: neutralizes residual ammonia downstream of the SCR.

Reactor: houses the catalysts, designed to withstand high temperatures, ensure homogeneous flow distribution and minimize pressure losses.

Urea injection system: tank, pump, heated lines, injector and mixer ensuring homogeneous and efficient atomization.

Control system: integrated sensors and onboard electronics regulate dosing in real time and interface with the engine.

CO & HC (carbon monoxide and unburnt hydrocarbons)

Catalyst : DOC (Diesel Oxidation Catalyst), oxidizing CO into CO_2 and HC into CO_2 + H_2O.

PM & PN (fine particulate matter and particle number)

Particulate filter : FAP or DPF (Diesel Particulate Filter), designed to capture and retain solid particles, with thermal or catalytic regeneration to sustain filtration efficiency.

02. Acoustic Attenuation

Optimized silencers, reactor unit and catalyst modules

Noise reduction up to **60 dB**

03. Thermal and Vibration Management

Compensators and flexible hoses : absorption of thermal expansion

Vibration-isolating supports : protecting equipment from vibration and minimizing structure-borne transmission.

04. Exhaust Piping Line

Designed to minimize interactions between components and reduce pressure losses, ensuring stable and efficient engine operation.

Case Study

Engineering and Integration of High-Performance SCR Reactors for Mission-Critical Data Center Applications

Context and Objectives

A mission-critical data center required the installation of eight 2,500 kW generator sets to ensure continuous power supply. The objectives were ambitious: achieve NOx emissions below 100 mg/Nm^3 at 5% O_2, integrate all equipment within a limited footprint, and guarantee flawless 24/7 operational reliability.

The project had to meet exceptionally high requirements in terms of atmospheric emissions, compactness and system availability. The challenge was to design an energy architecture capable of reducing nitrogen oxides by more than 95%, while complying with strict space constraints and facilitating maintenance operations to ensure uninterrupted service.

The technical solution implemented

Groupe Boët designed and supplied eight custom SCR reactors, integrated directly into the exhaust silencers to optimize space and combine gas treatment and acoustic attenuation functions. Each generator set was equipped with an autonomous control system connected to a centralized supervision platform, enabling precise dosing control and continuous performance monitoring. The scope of work also included operator training and the implementation of a preventive maintenance program to ensure long-term reliability of the installation.

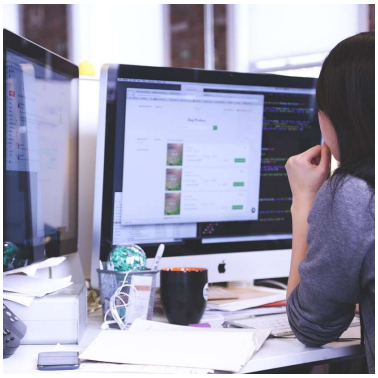
Performance results

The results confirmed the effectiveness of the solution: full regulatory compliance, NOx reduction from 2,270 to 100 mg/Nm^3, 45 dB(A) noise attenuation, and optimal integration within a highly constrained technical environment.

This project demonstrates Groupe Boët's ability to combine environmental performance, energy reliability and precision engineering to serve the most demanding infrastructures.

Our turnkey offering

Groupe Boët stands out through an integrated approach covering the entire lifecycle of the solution. Our teams ensure full technical and operational control at every stage, guaranteeing performance, reliability and regulatory compliance.



1 ENGINEERING AND DESIGN

Our teams deliver tailor-made engineering solutions, from feasibility studies to precise system sizing, ensuring perfect compatibility with every engine type. We produce optimized layout and integration plans that take into account the specific constraints of each site.

By combining aerodynamics, acoustics and emission-control expertise, we design comprehensive solutions that deliver performance, durability and operational comfort.

2 MANUFACTURING AND ASSEMBLY

Production is carried out in our ISO 9001:2015-certified workshops, ensuring full traceability of every component. Our welding processes and material selection comply with the most demanding international standards.

Each system is delivered with comprehensive technical documentation, ensuring transparency, compliance and seamless integration.

3 INSTALLATION AND COMMISSIONING

We oversee the installation through our own teams or a network of qualified partners, ensuring full compliance with technical and safety standards. Commissioning includes all adjustments and optimizations required to achieve nominal on-site performance. Acceptance tests and emission measurements confirm system compliance before operation begins.

Finally, dedicated training enables operating teams to quickly master the installation and ensure its full efficiency.

4 MAINTENANCE AND SUPPORT

Our preventive maintenance contracts ensure long-term system reliability and durability. 24/7 remote monitoring allows us to anticipate any operational deviation and take action before it affects performance. We ensure fast availability of genuine spare parts to guarantee optimal service continuity.

In the event of an unexpected issue, our expert technicians provide emergency on-site intervention wherever needed.

Value engineering for optimized solutions

By adopting a value-engineering approach, Groupe Boët delivers solutions perfectly aligned with the technical and economic requirements of its clients. This methodology ensures maximum performance, optimized costs, fully controlled integration, and a measurable reduction in the energy consumption of your equipment—resulting in sustainable, quantifiable savings.

We bring our expertise, adaptability and responsiveness to ensure the success of your projects.

The management of each project is based on key principles that ensure a smooth and high-quality customer experience:

› **A single point of contact** : A dedicated project manager supports you at every stage, streamlining communication and ensuring optimal coordination

› **Expertise** : With proven expertise in aero-acoustics and emission-control engineering, we design optimized systems that comply with the highest performance and reliability standards.

› **Flexibility** : We tailor both our solutions and our organization to the specific requirements of your project, no matter how complex it may be.

› **Responsiveness** : Our agile organization enables us to react swiftly and effectively to unexpected situations and project-specific requirements.

› **Experience & In-House expertise** : With full in-house management of the entire process, from design to installation, we ensure complete control over quality and lead times.

Groupe Boët does everything possible to ensure the success of your project, supported by a proven methodology and a constant commitment to client satisfaction.

Trusted by...

rehlko

Cummins

dalkia GROUPE EDF

COELMO GENERATORS

MAN

NAVAL GROUP

Groupe Boët, your specialist in emission management

Founded more than 150 years ago, Groupe Boët is a key European player in the comprehensive control of all emissions: Acoustics, Aerodynamics, Vibration and Emission Abatement.

We design, engineer, manufacture and install innovative, tailor-made aero-acoustic solutions for a wide range of industries.

Our achievements, proven solutions and long-standing market presence attest to our credibility and our capacity to deliver on the most demanding projects.

Our achievements, proven solutions and long-standing market presence demonstrate our credibility and our ability to meet the requirements of even the most complex acoustic projects.

Based in Tourcoing, in northern France, Groupe Boët designs and manufactures high-performance acoustic and aerodynamic solutions for demanding industrial environments. Our headquarters also hosts part of our production facilities, enabling us to remain close to our customers while ensuring controlled, locally managed manufacturing.

To support our international partners, we rely on subsidiaries in the United Kingdom and Spain, as well as production units in Eastern Europe, ensuring responsiveness, competitiveness and proximity wherever your installations are located.

Groupe Boët brings together a multidisciplinary team composed of:

- **4 PhDs in acoustics**
- **15 general engineers**
- **7 design engineers / designers**
- **1 PhD in aerodynamics**
- **10 acoustical engineers**

Our experts rely on the most advanced simulation and sizing tools available on the market (Ansys, Fluent, AcouS STIFF, IMMI, SolidWorks, Tekla...) to design tailor-made solutions that address the most complex acoustic, thermal and mechanical constraints. Our technical expertise, capacity for innovation and strong field experience make Groupe Boët a reference player in industrial acoustic engineering.

Other products in the range

Engine exhaust silencers

Vent silencers

Compressed air silencers

Boiler silencers

Inline silencers

Acoustic enclosure

With nearly 150 years of experience, a strong local and international presence, and a team of dedicated specialists, Groupe Boët has established itself as a trusted partner in aero-acoustic solutions. Through tailor-made systems, full control of our processes and a continuous commitment to innovation, we address the most complex challenges while ensuring reliable performance, long-term energy efficiency and optimal customer satisfaction.

Choosing to work with us means opting for technical excellence and a partnership built on quality, flexibility and responsiveness.

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Certified Company

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