



**INDUSTRIAL & MARINE
SILENCERS LIMITED**



Next Generation NOx Reduction

BLUNOX Digital Airless Multipoint® SCR Systems

For Stationary and Marine Power Plant Applications



Welcome

INDUSTRIAL & MARINE SILENCERS

When it comes to the reduction of noise and other pollutions, IMS really are world class – although as you can imagine, it's not in our nature to shout about it!

Our engineered solutions have a number of applications; from general volume minimisation to the management of more unusual noises; from particle removal to sophisticated control of emissions, we can custom make any of our units to fit an individual specification.

We manufacture exhaust silencers (both with and without spark arrestors), steam vent silencers, intake silencers, turbine silencers, emission reduction systems, generator enclosures and many more related ancillaries. Every step of the production process is carried out in-house at our purpose-built premises in the East Midlands, a central location with great transport links which allows us to service the whole of the UK and the wider world beyond.

Using our own teams of highly skilled engineers we can undertake total 'turn-key' projects from the design stage through installation, commissioning and on-site support. Our capabilities are not only limited to the technical and engineering aspects of a plant; we have a great deal of experience in working with local planning and environmental regulations across a very wide variety of countries (and conditions) throughout the world. This knowledge and earned respect within our field allows us to provide true project management including site surveys, problem analysis, structural calculations and foundation drawings.

For more information please visit www.silencers.co.uk.

BLUNOX A/S

BLUNOX A/S is the Industry Leader within SCR Emission Control Solutions for NOx Reduction.

We develop, manufacture and market BLUNOX SCR systems, which are based on the ground-breaking Digital Airless Multipoint Technology originally developed by BLUNOX for truck and bus applications and extensively tested in cooperation with leading engine manufacturers.

Focus today is on large engine applications and our standard product range fit engines/turbines with power ratings of 250 kW to 25 MW. Our clients include organisations, which are at the forefront within Defence, Commercial Shipping, Ship Building, Engine Makers, Power Generation/Utilities and trusted Contractors in general.

Our systems are available for marine, offshore, off-highway and stationary applications.

BLUNOX A/S is a member of DANSK TEKNOLOGI Group founded in 1982.

For more information please visit www.blunox.com.



The Digital Airless Multipoint® SCR System is so compact that it will fit into the space of the engine's existing silencer.

BLUNOX SCR System Overview

The system's main components are: Stainless steel catalyst housing, modular catalyst elements, airless TwinJet urea injection nozzles, a digital dosing system and a control unit. An optional soot blowing system is also offered.

1 Digital Dosing System Ensures Precise, Dynamic Response to Engine Load Variations

Long-term stable, high precision digital dosing of urea ensures high NOx-reduction without ammonia slip and minimum urea consumption. The digital dosing system has an ultra high, dynamic response to engine load changes which enables NOx reduction for applications with frequent engine load changes.

3 Ultra Compact Catalyst Will Fit into Existing Silencer Space

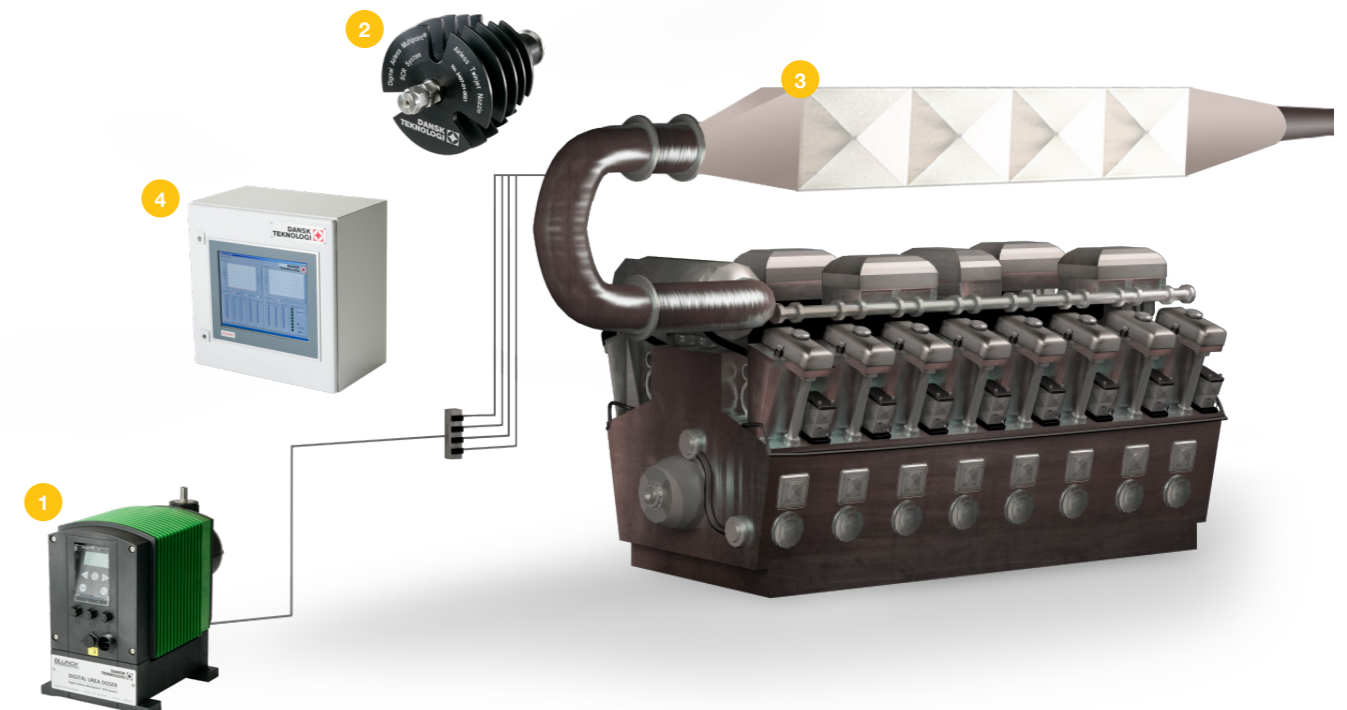
The DAM SCR System's compact catalyst elements enables a light weight installation that does not exceed the volume of the existing silencer, which can be removed. The structure of the catalyst elements make them highly resistant to temperature changes and ensures very low back-pressure.

2 Airless TwinJet Nozzles Eliminate Need for Compressed Air and Exhaust Gas Mixers

The patented multipoint airless nozzle design ensures effective NOx reduction without long urea injection pipes, exhaust gas flow dressers, exhaust gas mixers, and compressed air required by traditional SCR Systems. The airless nozzles are extremely robust, long-term tested and free from electronics and moving parts.

4 Advanced Control Software Ensures Optimal System Performance

Unlike most traditional SCR systems the DAM SCR system operates based on input from the engine controller. This ensures the most accurate and dynamic response to variations in NOx output and enables high NOx reduction without ammonia slip and minimum use of urea. The system user interface is highly intuitive and gives easy access to all system operating data including log of NOx reduction and urea consumption.





BLUNOX Digital Airless Multipoint® SCR Systems for Stationary Applications outperform traditional SCR systems and have several distinct benefits.

Benefits



Up to 98% NOx Reduction ensures compliance with the strictest emissions legislation

The Digital Airless Multipoint (DAM) SCR System utilises high precision digital dosing of urea to achieve high NOx-reduction without ammonia slip. This guarantees NOx reduction of up to 98% and NOx emissions lower than the strictest emissions legislation.

No Extra Fuel Consumption

Unique to the DAM SCR System, it has no need for compressed air for urea spray, long urea injection pipes, exhaust gas flow dressers, and exhaust gas mixers. These facts give a SCR system with very low back-pressure and energy usage resulting in no extra fuel consumption.

Easy and Low Cost Installation – Low Weight and Highly Compact

The DAM SCR System is designed to be low in weight and highly compact compared to traditional SCR systems. Key to achieving these goals is the use of a low weight honeycomb catalyst rather than a heavy traditional extruded catalyst. Also the system integrates silencer and catalyst so no extra space is needed compared to the existing/traditional silencer, which can be removed/eliminated. Finally, the absence of compressed air, long urea injection pipes, exhaust gas flow dressers, and exhaust gas mixers gives a very compact and low weight system.

No Adverse Effects of Running without Urea Dosing

The DAM SCR System will not be damaged or affect engine performance when running without dosing urea. This is important should the urea supply be exhausted or when choosing not to reduce NOx. In either case the engine can keep operating with no adverse effects.

Robust System with Low Maintenance Requirements

The system has been designed with robust components, many tested by leading engine manufacturers and proven to automotive standards. The airless injection nozzles are extremely robust, long-term tested and free from electronics and moving parts. Compared to traditional extruded catalyst elements, which are prone to cracking when exposed to sudden temperature changes, the DAM SCR System's honeycomb catalyst elements have a high tolerance to changes in temperature due to changes in engine load.

Maintenance intervals are longer or the same as for the engine. The catalyst elements are guaranteed for 16,000 operating hours at 100% effectiveness.

After this their effectiveness will gradually be reduced by roughly 8% effectiveness for each additional 10,000 operating hours. Typically, a complete change out of catalyst elements is needed for every 30,000-40,000 operating hours.

A complete change out of catalyst elements can be done in less than 6 hours thanks to the easy access design through the top of the catalyst housing.

Potential for 6-9% Saving in Fuel and CO₂ Emission

Today's engines compromise on fuel efficiency to keep NOx emissions moderate; by tuning the engine and thereby producing more NOx, which subsequently can be removed by the DAM SCR System, the fuel savings potential can be achieved.

Highly Corrosion Resistant

The DAM SCR System is designed to operate in the toughest environments and its construction in AISI 304 and AISI 316 grade stainless steel ensures high corrosion resistance.

Broad Exhaust Temperature and Engine Load Operating Range

Thanks to the use of digital dosing, the DAM SCR System has an ultra high, dynamic response to engine load changes and the honeycomb catalyst used has a broad operating temperature range and high resistance to SOx in the exhaust gas. This ensures reliable, consistent and high NOx-reduction across a broad operating range and enables NOx reduction for applications with frequent engine load changes.

Remarkable Noise Attenuation Tailored to Your Requirements

The DAM SCR System provides remarkable noise attenuation thanks to the design of the catalyst housing and reactor. On current installations a noise attenuation of 35 dB(A) has been readily achieved through the catalyst housing and reactor alone. Tailor made modular silencing units are available to be integrated into the catalyst housing so that specific noise frequencies can be targeted and eliminated.

Proven Track-record and Technology Tested by Leading Engine Manufacturers

The Digital Airless Multipoint Technology developed by BLUNOX has been extensively tested in cooperation with leading engine manufacturers and come with a proven track-record from applications with the most demanding customers, which are at the forefront within Defence, Commercial Shipping, Ship Building, Engine Makers, Power Generation/Utilities and trusted Contractors in general.

Selective Catalytic Reduction (SCR) Technology is the most effective method of eliminating NOx.

SCR Technology

The SCR technology was substantially rationalised and improved when BLUNOX developed and introduced the Digital Airless Multipoint® SCR Technology which will set the standard for next generation SCR systems.

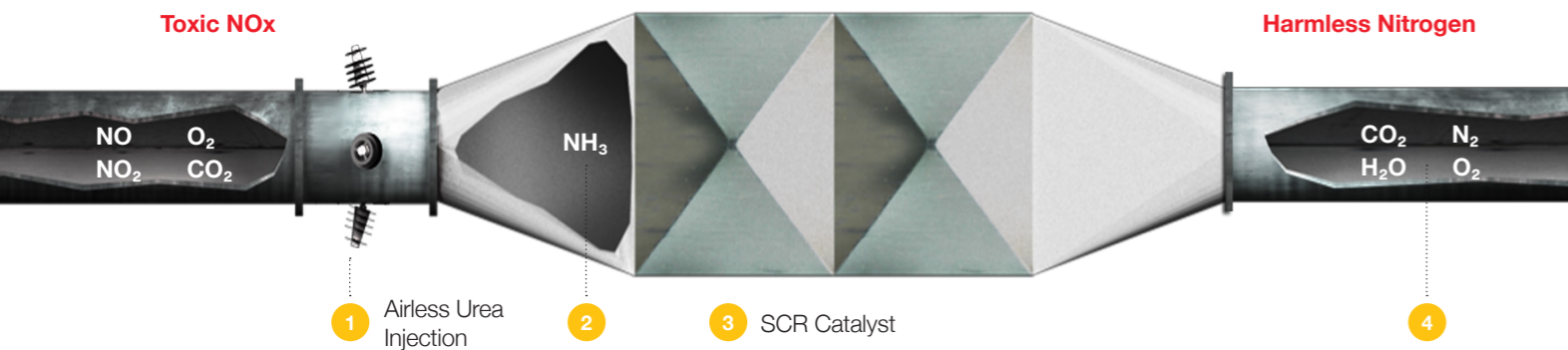


SCR – How it works

SCR works by injecting a cheap harmless substance, urea, into the exhaust gas and passing the mixture through a catalyst. This process transforms the toxic NOx gases into harmless nitrogen (79% of our natural atmosphere is nitrogen). Thanks to the Airless Technology there is no need for compressed air to atomise the urea.

DAM SCR Process From Toxic NOx to Harmless Nitrogen

- 1 Airless injection of urea solution
- 2 Conversion of urea to ammonia, NH₃
- 3 Reduction of NOx with ammonia through SCR catalyst
- 4 Output of harmless nitrogen, N₂



The Digital Airless Multipoint SCR process from toxic NOx to harmless nitrogen

Our Standards

“We are a company who not only know where we are going but also understand exactly where we have come from and therefore what our true strengths and enduring qualities are. Despite being real specialists in our original chosen field we have remained flexible enough to recognise other areas where our skills could be utilised.

Never being happy with just being ‘good’ at whatever we do has stood us in good stead and not only allowed us to gain and keep the confidence of our existing clients but also introduced us to many new ones too. ‘Innovative’, ‘Cutting Edge’ and ‘World Class’ aren’t merely our aspirations, they are the standards by which we measure ourselves in every aspect of our business.”

Worldwide Installations

FROM THE EAST MIDLANDS TO THE ANTARCTIC

Our base in Shepshed is just 5 minutes from the M1 motorway in the heart of the UK – great in terms of servicing all locations on this fair isle but, just as importantly, an ideal place from which to access the rest of the world.

Our equipment has quite literally been installed across the globe; culture and language might change from continent to continent but the need for innovation, quality and reliability always remains the same.

- Antarctica
- Argentina
- Australia
- Austria
- Belgium
- Brazil
- Bulgaria
- Canada
- China
- Colombia
- Denmark
- Egypt
- Finland
- France
- Germany
- Gibraltar
- Greece
- Hong Kong
- Hungary
- Iceland
- India
- Israel
- Italy
- Japan
- Malaysia
- Mexico
- Monaco
- Netherlands
- New Zealand
- Nigeria
- Northern Ireland
- Norway
- Philippines
- Poland
- Portugal
- Russian Federation
- Singapore
- South Africa
- Spain
- Sweden
- Thailand
- Turkey
- UAE
- United Kingdom
- USA



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