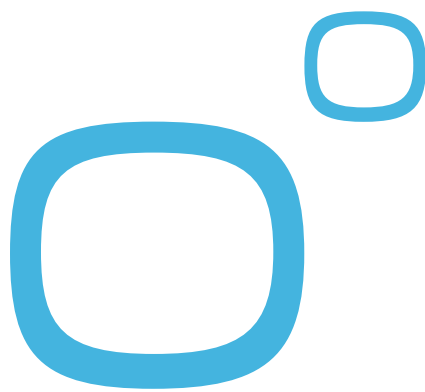


NITROGEN GENERATORS

DISTRICT HEATING PLANTS



FLAIRMO

DISTRICT HEATING

A CORNERSTONE OF EUROPE'S ENERGY TRANSITION

Across Europe, district heating is undergoing its biggest transformation in decades. Utilities are moving away from coal and fossil fuels toward electrified, low-carbon and renewable heat sources – heat pumps, electric boilers, surplus heat from industry, and large-scale thermal storage.

New plants are being built, existing networks are being expanded, and ageing infrastructure is being upgraded. Behind every new installation is a long-term investment that needs to perform reliably for decades to come.

50%

of Europe's energy is used
for heating & cooling

2050

EU target for climate-neutral
heating systems

80M+

Europeans connected to
district heating networks

WHY NITROGEN MATTERS

As district heating systems grow larger, more electrified and more complex, the demand for clean, oxygen-free environments inside tanks, boilers and degassers grows with it. Oxygen is the single biggest driver of corrosion in heating water systems.

Left unmanaged, it damages steel, shortens equipment lifetime, blocks pipework, and reduces plant availability. Nitrogen blanketing and nitrogen-based degassing are proven methods to eliminate oxygen from the system, keeping water chemistry stable, components protected, and operations predictable for decades.



150+

**NITROGEN GENERATORS
DELIVERED IN DENMARK**

PROVEN IN THE DANISH MODEL

Denmark is widely regarded as a reference market for modern district heating. FLAIRMO has delivered more than 150 nitrogen generators to Danish district heating sites – covering accumulator tanks, electric boilers and membrane degassers across utilities of all sizes.

This experience, gained in one of the most mature district heating markets in the world, is now available to utilities across Europe building the next generation of heat networks.

ACCUMULATOR TANKS

WHAT IS AN ACCUMULATOR TANK?

Accumulator tanks store hot water produced during low-demand or low-cost periods, and release it when demand is high. They are a key flexibility asset in modern district heating, allowing utilities to use electric boilers and heat pumps when electricity is cheap and green, and to balance fluctuating renewable power in the grid. Tank sizes range from a few hundred cubic metres at smaller utilities to 50,000 m³ or more at large urban plants.



WHERE CORROSION STARTS

The problem sits at the top of the tank. Above the water, there is always a headspace. If this headspace contains air, oxygen is in constant contact with the water surface:

- Oxygen dissolves into the water and circulates through the entire district heating network
- The water surface and the upper tank walls begin to rust

Over time, this rust travels with the water into the pipework, clogs filters, damages pumps, and shortens the lifetime of heat exchangers and valves.



HOW NITROGEN SOLVES IT

By filling the headspace with high-purity nitrogen, the internal tank walls are protected from oxidation as water levels rise and fall during charge and discharge cycles. This ensures that the wet steel surfaces left behind are never exposed to oxygen, eliminating the driver for corrosion in the most vulnerable areas of the tank.

KEY BENEFITS



Corrosion protection

Across the tank and the wider network



Longer lifetime

For tanks, pipework, pumps and heat exchangers



Cleaner water chemistry

Fewer filter changes, less sludge, less maintenance



Stable operation

During rapid charging and discharging cycles

PURITY AND FLOW REQUIREMENTS

A purity of 99.5% or higher is typically sufficient for accumulator tank blanketing. Required flow depends on tank size and how often the tank is charged and discharged. FLAIRMO sizes the generator to match the specific tank volume and operating profile.

ELECTRIC BOILERS

WHAT IS AN ELECTRIC BOILER?

An electric boiler (often referred to as an electrode boiler in large-scale applications) is a high-capacity system that converts electrical energy directly into thermal energy. Unlike traditional boilers that use a flame to heat metal tubes, electrode boilers use the water itself as a conductor. By passing high-voltage current through the water between electrodes, the water's natural resistance generates heat with nearly 100% efficiency.



THE ROLE OF ELECTRODE BOILERS IN MODERN DISTRICT HEATING

According to industry standards and Danish best practices, electrode boilers are essential for the transition to fossil-free peak load production. By converting electricity directly into heat with near 100% efficiency, these systems allow district heating plants to capitalize on low electricity prices and balance the power grid.



PURITY AND FLOW REQUIREMENTS

Electric boiler applications typically require nitrogen at **99.5%** purity or higher, with system pressures up to 12 bar or more. FLAIRMO has delivered tailored solutions for leading electrode boiler brands, including the flushing and commissioning workflows these systems require.

NITROGEN SERVES TWO FUNCTIONS

1. Because electrode boilers operate at high power densities, they are prone to hydrogen generation through electrolysis. A nitrogen generator is used as a "sweep gas", keeping the hydrogen level low, before it reaches explosive concentrations.
2. Simultaneously, the nitrogen prevents corrosion in the headspace area by displacing oxygen, protecting the boiler shell and internal components from oxidation.

KEY BENEFITS

-  **Explosion Prevention (hydrogen Removal)**
Eliminates explosive risks by flushing out H₂ gas
-  **Superior Corrosion Protection**
Extends the boiler's lifespan by displacing oxygen, preventing internal rust
-  **Reduced Maintenance Costs**
Minimizes the need for chemical water treatment and manual cleaning.
-  **Stable System Pressure**
Maintains a consistent, inert atmosphere that prevents air ingress during rapid start-ups and load changes.

MEMBRANE DEGASSER

WHAT IS AN MEMBRANE DEGASSER?

A membrane degasser removes dissolved gases – oxygen and carbon dioxide – from the district heating water. The water flows past a fiber membrane, and the dissolved gases are drawn out, leaving behind clean, low-oxygen water that can safely circulate through the network.

With this system you extend the lifetime of the pipework carrying the district heating water, as removing dissolved oxygen significantly reduces the risk of rust and corrosion.



WHY NITROGEN IS REQUIRED

The membrane degasser needs a sweep-gas to remove the CO₂ and O₂ molecules from the water. Here, nitrogen is the only practical option. As an inert gas, it carries the dissolved gases away without reacting with the water or adding new contaminants. A FLAIRMO nitrogen generator delivers this sweep-gas continuously, ensuring the degasser performs at full capacity every hour of every day.

-  **Near-Zero Oxygen Levels**
Reduces dissolved O₂ to ultra-low levels, stopping corrosion in the district heating network.
-  **Chemical-Free Treatment**
Eliminates the need for chemical oxygen scavengers - cleaner water and lower environmental impact.
-  **Enhanced Safety**
Removes the need for handling high-pressure gas cylinders or liquid nitrogen deliveries.
-  **Supply Security**
Eliminates the logistics, rental costs, and risk of running out of gas.

PURITY AND FLOW REQUIREMENTS

Membrane degassers require 99.99% nitrogen purity to ensure the membrane fibers operate under the right conditions. Flow requirements depend on water volume and the dissolved oxygen load, and FLAIRMO sizes the generator accordingly. Our internal and external air supply ranges cover the full spectrum, from small district heating plants to large urban networks.

NITROGEN GENERATORS



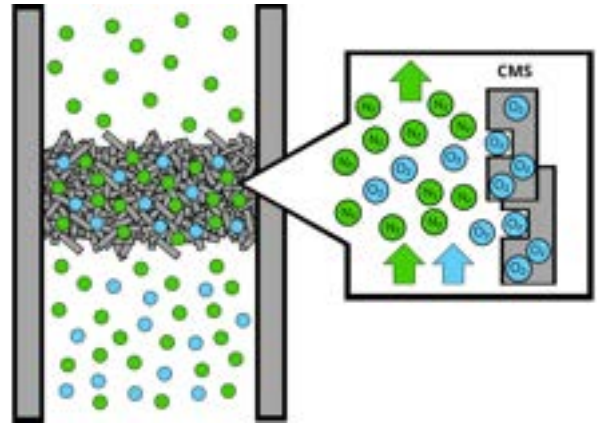
ON-SITE NITROGEN GENERATORS

District heating plants run 24/7, often with seasonal peaks that push equipment to its limits. Relying on bottled nitrogen for blanketing, boiler protection or degassing means constant logistics: deliveries, ADR handling, bottle swaps, rental fees, and the risk of running out at the worst possible moment.

An on-site nitrogen generator removes all of that. It produces nitrogen directly from ambient air, continuously, for as long as the plant needs it.

THE PSA TECHNOLOGY

FLAIRMO nitrogen generators use PSA (Pressure Swing Adsorption) technology to separate nitrogen from oxygen and other gases. Compressed air passes through CMS (Carbon Molecular Sieves) filled towers that alternate between adsorption and regeneration, retaining oxygen while allowing nitrogen to flow continuously. The system delivers purities from 95% up to 99.9995%, offering a cost-effective, efficient, and reliable on-site solution with a long operational lifespan.



Sustainability

A greener solution with less waste and emissions compared to traditional gas supply



100% Duty Cycle

Continuous, uninterrupted on-site supply of nitrogen gas for 24/7 operations



High Flexibility

Purity range from 99.5% to 99.999% supports all district heating applications



Plug-and-Play

Integrated compressor inside the generator, makes it a very compact plug-and-play solution



Manufactured in Denmark

With electronics, tanks, valves and hoses all produced under FLAIRMO's own quality control



PRODUCT SOLUTIONS

INTERNAL AIR SUPPLY

This series of FLAIRMO nitrogen generators has integrated compressor inside the cabinet, making it a very compact and reliable plug-and-play solution, that takes up limited space.

Model	N2G-3C	N2G-10C	N2G-15C	N2G-20C	N2G-40C	N2G-40CS
Product						
Flowrate	3 NI/min	10 NI/min	15 NI/min	20 NI/min	40 NI/min	40 NI/min
Nitrogen purity	Up to 99,9995%	Up to 99,9995%	Up to 99,9995%	Up to 99,9995%	Up to 99,9995%	Up to 99,9995%
Compressor	Internal compressor	Internal compressor	Internal compressor	Internal compressor	Internal compressor	Internal compressor
Tank size	4 Liter	6 Liter	6 Liter	6 Liter	6 Liter	6 Liter
Noise level	55 dB(A) / 1 m	55 dB(A) / 1 m	60 dB(A) / 1 m	62 dB(A) / 1 m	65 dB(A) / 1 m	55 dB(A) / 1 m
Duty cycle	S1 - 100%	S1 - 100%	S1 - 100%	S1 - 100%	S1 - 100%	S1 - 100%
L x W x H	495 x 230 x 545 mm	722 x 270 x 551 mm	722 x 270 x 551 mm	722 x 278 x 785 mm	825 x 278 x 1647 mm	640 x 618 x 854 mm
Weight	28 kg	50 kg	52 kg	80 kg	130 kg	110 kg

EXTERNAL AIR SUPPLY

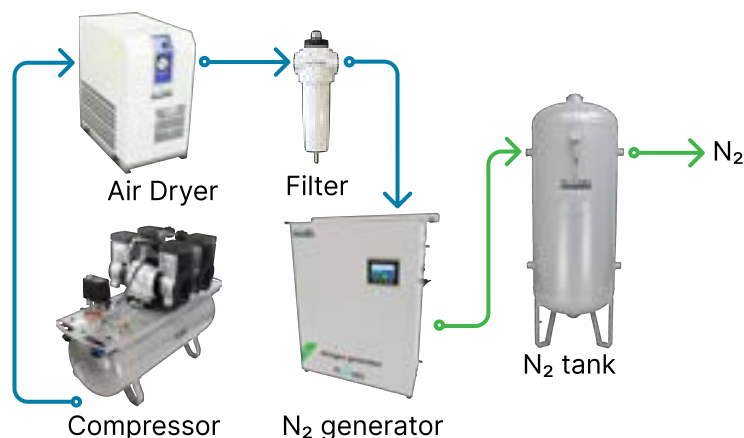
Designed for external air supply, this series integrates into a larger compressed-air system with the compressor located outside the cabinet. A reliable solution delivering high flow rates.

Model	N2G-15	N2G-30	N2G-40	N2G-80	N2G-120	N2G-160
Product						
Flowrate	15 NI/min	30 NI/min	40 NI/min	80 NI/min	120 NI/min	160 NI/min
Nitrogen purity	Up to 99,9995%	Up to 99,9995%	Up to 99,9995%	Up to 99,9995%	Up to 99,9995%	Up to 99,9995%
Compressor	45 l/min @ 7 bar	90 l/min @ 7 bar	120 l/min @ 7 bar	240 l/min @ 7 bar	360 l/min @ 7 bar	480 l/min @ 7 bar
Noise level	50 dB(A) / 1 m	50 dB(A) / 1 m	50 dB(A) / 1 m	50 dB(A) / 1 m	50 dB(A) / 1 m	50 dB(A) / 1 m
Duty cycle	S1 - 100 %	S1 - 100 %	S1 - 100 %	S1 - 100 %	S1 - 100 %	S1 - 100 %
L x W x H	722 x 270 x 551 mm	722 x 270 x 551 mm	722 x 278 x 785 mm	825 x 278 x 1647 mm	703 x 411 x 1670 mm	703 x 411 x 1670 mm
Weight	45 kg	48 kg	75 kg	115 kg	180 kg	230 kg

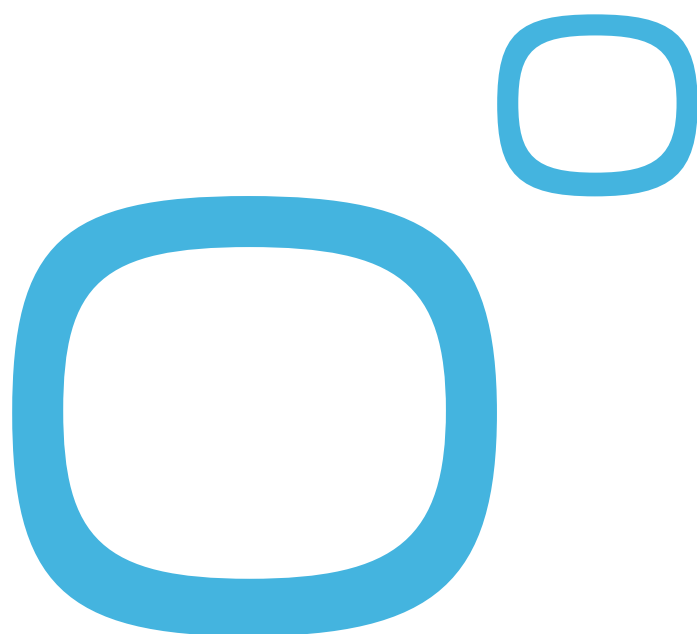
INTERNAL AIR SUPPLY SOLUTION



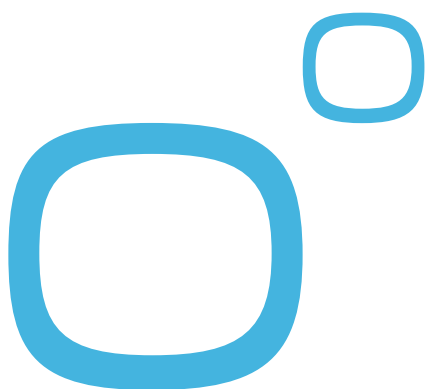
EXTERNAL AIR SUPPLY SOLUTION



A buffer tank is not required for operation, but can be added as an option if needed.



Nitrogen at your convenience



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