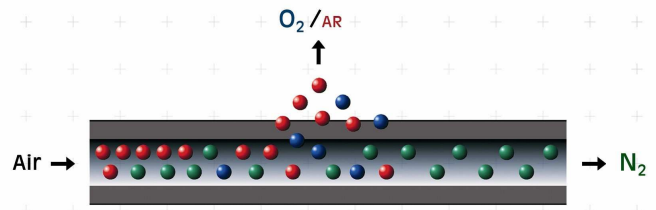


## Nitrogen for refinement and quality preservation of foodstuffs

Food and luxury foodstuffs should always be available in sufficient quantity, with excellent quality and maximum possible freshness. In compliance with these preconditions, it is necessary to ensure professional storage, filling, frothing and packaging of rapidly perishable dairy products under protective atmosphere.



Perceptible quality attributes, such as freshness, colour, structure, taste and consistency, or imperceptible properties such as prevention of microorganisms, are ensured, e.g. when filling beverages such as wine, beer and fruit juice, or when packaging dairy products, such as cheese, yogurt, soft cheese slices, pastries, confectionery etc. under non reactive atmosphere, i.e. oxygen content in the air needs to be significantly reduced. With regard to its characteristics to be inert, non toxic, dry, flavourless and inodorous, nitrogen is an extremely advantageous gas for the foodstuff industry and dairy products.

Due to these properties nitrogen minimises:

- the creation and growth of microorganisms such as bacteria, mould, fungal, rancidity
- biochemical, enzymatical and physical processes
- the loss of flavouring agents and vitamins
- water absorption with moisture sensitive products
- the peril of flour-, or cereal dust explosions.

Nitrogen is often supplied in steel cylinders, bundles or by truck from tank installations. INMATEC now provides a reliable, economic and cost-efficient alternative to the conventional nitrogen supply, the nitrogen generator.



## Functioning principle of Nitrogen generators

The generators are fed with normal compressed air. The compressed air is cleaned by filter units mounted upstream and subsequently flows into a membrane module composed of multiple small hollow fibres. The various components contained in the air, such as water vapour, oxygen, nitrogen, rare gases and carbon dioxide diffuse through the hollow fibre membrane at different rates according to their respective molecular structure. Oxygen, carbon dioxide and hydrogen having a high diffusion rate are eliminated very rapidly from the air mixture. Nitrogen has a low diffusion rate and penetrates the hollow fibre membrane very slowly, thereby it becomes enriched on its path through the hollow fibres. Nitrogen purity is determined by its flow rate. By variation of pressure and volumetric flow it is possible to adjust the nitrogen generator exactly to the required nitrogen purity and supply quantity. The core piece of the nitrogen generator is the hollow fibre membrane. This part is made of synthetic material during an elaborate process combined with well defined temperature and pressure data, involving a specific solvent. The performance of each generator is determined by the length and arrangement of each single hollow fibre membrane.

## The adequate nitrogen generator for any demand

Nitrogen demand is not continuous in most business operations. Requirements under varying specific application processes fluctuate from a few litres per day up to very high volumetric flow rates per hour. The nitrogen generators supply between 0,1 and 5.000 Nm<sup>3</sup>/h at purity grades of 95 % up to 99,999 %. By use of the "in-house air fractionation plant" nitrogen is permanently available at steady high quality. The generators are easy to operate, with only small space requirements and negligible running costs.

The plants are designed in accordance to demand for various purity grades and performance characteristics, using the membrane technology for purity up to 99,99 %, and with PSA-Technology (Pressure Swing Adsorption) under use of carbon material (CMS) for purity up to 99,999 % and 10 ppm.

Ambient temperature should be provided between 2 °C and 40 °C.

Both wall- and floor mounting versions are available.

The nitrogen generator only needs to be connected to the Compressed air supply line and the valve to be opened, then the in-house air fractionation plant starts to produce the nitrogen.



### Unsere Technologien:

Membran- und PSA-Anlagen zur Stickstoffherzeugung bis 99,999%/10 ppm  
Mengen von 2 bis 5000 Nm<sup>3</sup>/h.

### Anwendungen:

- Verpacken
- Überlagern
- Frischhalten
- Aufschäumen
- Inertisieren



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By comparison to conventional gas steel cylinders, bundles or tank installations the user holds following benefits:

- constant high quality of nitrogen
- assured availability at anytime.

#### Low installation and running costs

No handling costs and no safety hazard as for cylinders or gas bundles  
Compared to conventional nitrogen gas cylinders cost savings of up to 80 % are possible.

Cross section of hollow fibre membrane under pressure with discharge of N<sub>2</sub> and O<sub>2</sub>

Seitenrand rechts – von oben nach unten:

N<sub>2</sub> – Nitrogen domestic production !

The technologies we provide:

Membrane- and PSA-plants for nitrogen generation up to 99,999 %/10 ppm  
Quantities from 2 up to 5.000 Nm<sup>3</sup>/h.

Applications:

- Packaging
- Overlaying
- Freshness preservation
- Frothing
- Inerting



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Mengen von 2 bis 5000 Nm<sup>3</sup>/h.

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