

# Gas injection moulding with nitrogen



# Gas injection moulding with know-how from Linde

Linde has many years' experience in gas application in many branches of industry.

Its extensive know-how extends from process engineering development through the integration of the gas application into the customer's process, up to the most cost-effective gas supply in each case.

In co-operation with industrial companies, commercial enterprises and research institutes our engineers are working on new innovative gas applications.

Due to the integration of the AGA, we have further reinforced our know-how especially in plastics processing.

Our goal is to deliver more than just gas. With industrial and application know-how we help our customers to improve decisively the productivity of their processes. An important and proven technique in plastics processing is the gas injection moulding technique.



*Photos Cover: Maximator®  
left: grip for a child's bicycle seat  
right: handle of a motor saw*

The gas injection moulding technique (GIM) is a special injection moulding method for thermoplastics. In this case nitrogen is injected under high pressure in the still melted polymer mass. The nitrogen forces the melted mass out from the core of the component and presses it against the mould surface. After solidification the gas is released from the cavity.

The result is a plastic component that is superior to a solid component in several ways:

- **Lighter weight with approximately the same strength**
- **Saving of plastic material**
- **Shorter cycle times due to faster cooling**
- **No sink marks at places with material accumulations**
- **Better dimensional accuracy**

To avoid the oxidation of the plastic under high temperatures and gas pressures, pure nitrogen is used preferably for the gas injection.

Nitrogen moreover prevents contamination of the gas injection system by oxidised hydrocarbons from machine lubrication and melted plastic mass. This reduces the maintenance and repair expense.



Photo: Maximator®

**Automobile blinker lever**

# New supply concept

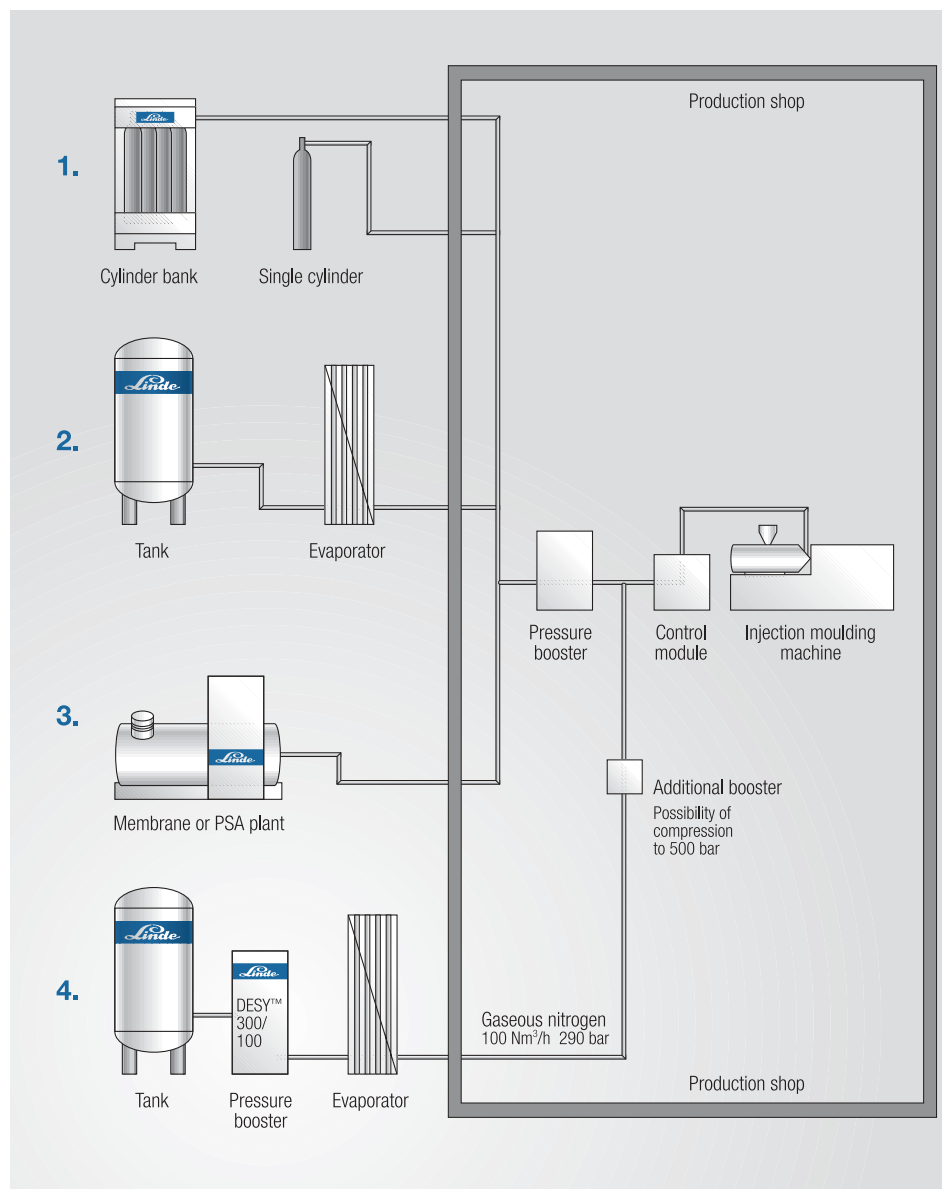
Linde offers a comprehensive and flexible supply program for supplying nitrogen. The Linde application engineers determine the most expedient supply version for the relevant plant based on the customer's specific needs. All economic and technical aspects are taken into account in this case.

To facilitate for the customer the simplest and smoothest production with the gas injection moulding technique, flexible solutions in gas supply are a matter of course at Linde.

In principle the following supply options are available:

- 1. Cylinders or banks of cylinders** for tests or at the start phase of production
- 2. Vacuum-insulated tanks** store nitrogen in liquefied form. The gas volume required in each case is evaporated without auxiliary energy. This version is preferred for full scale production.
- 3. Nitrogen generation on site** with membrane or PSA plants.
- 4. New supply concept:**

**Nitrogen supply with the DESY™ 300/100 pressure boosting system.** This concept is of interest for all users of the gas injection moulding technique with a higher nitrogen demand.



# The DESY™ 300/100 pressure boosting system

In contrast to conventional compressor systems, the nitrogen is compressed in a liquid state up to 300 bar in the DESY™ 300/100 pressure boosting system developed (and patented) by Linde.

After the DESY™ 300/100 the liquid nitrogen is evaporated in a high-pressure evaporator.

An (e.g. pneumatically operated) additional booster, which can be operated with very low energy requirements, is required only if an even higher pressure (> 300 bar) is required.

## Advantages

- Unchangingly high quality of the injection moulded parts because of the very pure and oil-free nitrogen
- Lower energy requirements due to cost-effective liquid compression
- Lower maintenance costs than in alternative compressor systems
- High process safety



# Competence Where you need it.

Linde industrial gases are used in manufacturing industries, in the fields of chemistry, metallurgy, food processing, medicine, specialty gases, power and the environment. In each area, Linde complements your specific knowledge with an expertise and competence in gas technology that can bring lasting and concrete benefits.

Speaking your language and understanding your specific processes and concerns, Linde can make your gases work harder for you. We can offer know-how, customer-specific hardware and total gas handling. Linde and AGA have now combined their resources. To your advantage. Our local expertise is supported by a global network and database of applications knowledge.

With all of this at your service, it's not hard to turn the gas you use from a production cost into a productivity-enhancing investment.



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