

Making our world more productive



# MAPAX<sup>®</sup>. FAQs.



# Gas.

## **Which gas mixture should I use?**

It depends on the type of food you produce, the shelf-life you need and the way your product is consumed. For detailed information, refer to the specific MAPAX® flyers and your local Linde application engineer. Tests will probably need to be conducted to decide the optimum mixture.

## **I am just starting out with the MAP system.**

### **What equipment do I need?**

Most systems require a minimum of a regulator, a flowmeter and piping. It is recommended to start with the pre-mixed single cylinders. Contact your local Linde application engineer to see what else might be needed.

## **Is it better to purchase pre-mixed cylinders or to purchase pure gases and mix them on site?**

This depends on the volume and the type of production at your facility. If the volumes are large or your plant produces various products with different gas requirements, it would be better to mix the right gases on site.

## **Where can I place the cylinders that I am using?**

Ideally you would want them out of the processing area for quality and hygiene reasons. Please refer to your local regulations.

## **How much pressure do I need to supply to my machine?**

This depends on the type of machine and the type of product being run. Consult your machine manufacturer as well as your local Linde application engineer.

## **If I use more gas, will using individual cylinders become more expensive?**

Yes. As your business grows, so will your gas consumption. It is important to consult your local Linde representative to work out the best time to switch from cylinders to a bulk tank supply mode.

## **What about safety for the use of gases?**

We provide safety information and training. Each country has its own safety regulations for the use of gas. These regulations must be followed and integrated into your quality systems. Our specially trained experts will support you here.

## **What precautions should be taken when using gas mixtures with a high oxygen content?**

Please contact the machine supplier to check whether the machine is suitable for operation with mixtures containing high oxygen levels. The machine has to be specified for high oxygen ratings.

## **What are the functions of different gases?**

The most important gas is CO<sub>2</sub>, since it delays the growth of microorganisms by dissolving into the food. N<sub>2</sub> is used to replace O<sub>2</sub> and thereby decrease deterioration. It is also used as a buffer gas. O<sub>2</sub> is used to keep the red colour of meat and for the respiration of fruit and vegetables. The gases are normally used in mixtures to suit the needs of the specific product.

## **Why should I use food-grade gases?**

Industrial gases do not meet the legal demands relating to the quality, traceability, labelling and handling of food-grade gases as additives.

# Food.

## **How far can I extend the shelf-life of my products by using an MAP system?**

That depends on many factors such as food product, temperature, hygiene, package and gas mixture. Generally, shelf-life can be increased by a period ranging from days to several weeks. For specific information, see the MAPAX booklet for your particular product.

## **Can I freeze a product that is packed in a modified atmosphere?**

Yes- but it would be more effective and efficient to first freeze the product and then pack it in a modified atmosphere. Make sure the packaging material is suitable for freezing.

## **Which gas or gas mixture can prevent the greenish colouring on the ham I produce?**

This greenish colouring is caused by bacteria grown naturally during processing. There is no gas or mixture that can change this afterwards.



**The meat I pack under MAP loses its colour, but the colour reappears after I open the package. Am I using the right gas mixture?**

The myoglobin molecule, which is responsible for the colour of meat and meat products, turns different colours with different gases. For recommendations relating to the correct gas mixture, see the flyer "MAPAX – Best for meat and meat products".

**The sliced meat product I pack under MAP turns grey. Sometimes only spots on the meat have different colours. Could that be caused by a wrongly filled gas cylinder, or is it caused by the gas mixture in general?**

The gases and mixtures in our food-grade gases are controlled constantly and the wrong labelling or filling of a cylinder is almost impossible. The grey spots may be caused by a number of factors. To give you just a few ideas: the UV filter of the films could have been changed so that it no longer matches the light exposure, additives could have been changed, or the process could have been altered. Even raw materials like water and meat can vary. Maybe the optimum gas mixture is not being used, or there is an excessively high residual oxygen level in the package or condensed water that can fall down from the lid. Contact your local Linde engineer for tests.

**Why does drip loss appear in fresh meat in a modified atmosphere?**

Drip loss is caused by meat handling and processing. Carbon dioxide and oxygen are absorbed and metabolised by the product and microorganisms, creating a partial vacuum inside the container. In fresh meat packaging, this vacuum may be strong enough to actually squeeze water from the meat if insufficient nitrogen is present in the headspace. This

can result in drip inside the package. Adding nitrogen should minimise the problem.

When I open the food package, I can smell a specific odour. How can we explain this? In most cases when food is properly stored, this is a normal phenomenon. Each product generates its own odour which consists of many volatile compounds that collect in the headspace of the package. Wait a minute after opening. If the smell continues, please check the quality further.

**Which gas or gas mixture should be used for the ripening of meat?**

Meat can be successfully ripened in mixtures of CO<sub>2</sub> and N<sub>2</sub>. The mixture depends on the type of meat and how it is cut.

**There are some pale grey, almost white spots on smoked sausages. The sausages are rinsed, cooled in a cryogenic freezer and then packed in MAP. How can I prevent this?**

There may be a number of reasons for these spots, for example, a local low temperature area could arise during the cooling process that often comes before the slicing. Cryogenic freezing involves very low temperatures that can cause bleaching. Contact your application engineer to check the freezer. Changes in various steps of the process may influence this.

# Packaging.

## **Does the package labelling have to indicate that the produce is packaged in a modified atmosphere?**

That depends on regional regulations. For EU countries, if the durability of a food has been extended by being packaged in a modified atmosphere, the packaging must state: "Packaged in a protective atmosphere".

## **What headspace (gas volume) is used in the package?**

That depends on the food product and type of package. The gas volume / product volume ratio lies between 0.5 for sausages and 2 for fish.

## **I get condensation in my package – what's wrong?**

The most likely reason is the temperature difference between the product and the storage temperature. We can improve packaged product visibility by using anti-fogging films. The product should always have the lowest possible temperature at the moment of packaging and be kept at the same temperature or lower during storage. The package could also be punctured. Check the residual oxygen.

## **My packages inflate over time. Is the product fermenting?**

This is nearly always due to the CO<sub>2</sub> which is generated by the product. This can be caused by too high temperatures (exceeding 4°C) over a certain time. This process cannot be reversed by cooling the product down again. Some products, such as hard cheeses, develop CO<sub>2</sub> through natural fermentation; this process can sometimes continue after packing and cause an undesirable inflated effect. The package can also be contaminated and develop unwanted gases which cause it to expand. Check immediately with your food lab.

## **Why do MAP packages collapse?**

This is a normal physical phenomenon that often happens to products with a high water content. CO<sub>2</sub> is a basic compound in MAP mixtures and dissolves easily in the water and fat phase of a product kept at low temperatures. That's why the amount of CO<sub>2</sub> in the head-space decreases and creates a small degree of underpressure inside the package.

## **How do I know that I have the right gas volume and mixture in the package?**

There are several types of gas analysers on the market. They are easy to use and will give you fairly accurate answers to questions about mixtures and residual O<sub>2</sub> levels. It is important to establish good routine checks to make sure you do not package a large amount of produce and end up with a less-than-optimum outcome. Your Linde application engineer will assist you by advising on the mixture and equipment best suited to your needs.

## **Why does the residual oxygen in the package increase over time?**

There are a few reasons why this might happen. There could be a leak in the package or the oxygen barrier may not be high enough. Moreover, air (containing 21 % oxygen) could have been trapped within the product during packaging (cakes and breads for example). However, the most common reason is leaks in the sealing.

## **How much residual oxygen is recommended in the package?**

This depends very much on the product. Consult your local Linde application engineer.

## **Linde GmbH**

Gases Division, Dr.-Carl-von-Linde-Strasse 6-14, 82049 Pullach, Germany

Phone: +49 89 7446 0, [www.linde-gas.com](http://www.linde-gas.com)

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