MAPAX® food preservation.

Winning the race against time.

From the very moment fruit is picked, corn is harvested or fish is caught, the race against time begins. From then on, natural deterioration and spoilage (internal factors like water activity, pH value, type and quantity of product microorganisms) endanger the quality and shelf-life of the foodstuff. However, external factors (transport conditions, temperature etc.) also place a strain on the product’s freshness. In order to slow down the loss of natural freshness and quality, an effective and intelligent concept of food preservation has been developed – Modified Atmosphere Packaging (MAP). Through the use of natural gases and adequate packaging materials and machines, the quality of foodstuffs is maintained and their shelf-life enhanced.

And the winner is … MAPAX®.

MAPAX® from BOC is a tailor-made MAP program based on the necessary data relating to foodstuffs, gases and packaging. It relies on close cooperation between the suppliers of the packaging material, the packaging machines and the gases. The purpose of this collaboration is to meet the demand for an efficient and cost-effectively packaging system, with consistent product quality throughout the entire distribution chain from the packaging itself to the attractive display in the chilled-food counter. Moreover, by using the advantages of MAP technology and applying them to a variety of specific needs, food manufacturers are able to develop new products for new markets.

MAPAX® benefits.

Improved preservation.

MAPAX® successfully inhibits the deterioration of foodstuffs in a natural way. With significant gains for manufacturers and clients, MAPAX®:

- radically extends shelf life
- keeps products fresh and appetising
- ensures fewer returns through spoilage

Improved distribution.

Goods protected by MAPAX® can be delivered more frequently and across longer distances. This enhances planning flexibility and rationalises the workflow from the delivery of raw materials to the transporting of manufactured goods. MAPAX® helps to:

- reduce preservative requirements
- extends shelf-life and enables greater geographical distribution
- rationalises logistics

Improved marketing.

If packaged by MAPAX®, products gain days or even weeks of high quality shelf-life. They are available to consumers for longer periods and may include more delicate raw materials. Thus, MAPAX®:

- allows the creation of new dishes and products
- allows highly attractive and marketable packaging

For more information on how MAPAX® can best work for your organisation, please contact BOC on:

Australia
131 262
Email: contact@boc.com
www.boc.com.au
BOC Limited
Level 24, 230 Queen Street
North Quay, Brisbane
Queensland 4000
AUSTRALIA

New Zealand
0800 111 333
Email: customer.services@boc.com
www.boc.co.nz
BOC Limited
Level 9, 970 - 988 Great South Road
Penrose, Auckland
NEW ZEALAND

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MAPAX® solutions.

Intensive research and know-how.

Our parent company, The Linde Group works closely with food research institutes in many countries, e.g. SIK (Sweden), VTT (Finland), Campden (UK).

In laboratories of SIK, for example, various simulations are carried out to determine the potential risks from microorganisms.

Such studies provide the information necessary for determining safe shelf-life periods. Because experts at SIK know exactly how different bacteria are affected by the combination of temperature, atmosphere and other such parameters as permeability, they offer MAPAX® solutions that will ensure maximum microbiological security for each foodstuff.

MAPAX® everywhere.

E.g. in the food industry, MAPAX® offers a complete menu of solutions that will ensure maximum microbiological security for each foodstuff.

Such studies provide the information necessary for determining safe shelf-life periods. Because experts at SIK know exactly how different bacteria are affected by the combination of temperature, atmosphere and other such parameters as permeability, they offer MAPAX® solutions that will ensure maximum microbiological security for each foodstuff.

MAPAX® gas atmospheres.

Preservation the natural way.

Modified atmosphere packaging (MAP) is a natural shelf-life-enhancing method that is growing rapidly on an international scale. It often complements other techniques, such as high pressure and vacuum methods or oxygen absorbers. The correct gas mixture is key to maximum high quality by retaining the original colour, texture and appearance of the foodstuff.

The gas mixture must be chosen with due consideration of the particular foodstuff and its properties. For heat-pasteurized products with a high moisture content, it is especially the growth of microorganisms that has to be inhibited. On the other hand, heat-pasteurized products with a high fat content and low water activity, oxidation protection is the most important.

Carbon dioxide – most important.

Carbon dioxide is the most important gas in the field of MAP technology. Most microorganisms such as mold and the most common aerobic bacteria are strongly affected by carbon dioxide. The growth of aerobic microorganisms, in the other hand, is less affected by the gas atmosphere. Carbon dioxide inhibits microbial activity by effectively dissolving into the food’s liquid and phase, thereby reducing the intracellular concentrations of essential nutrients or by directly inhibiting the growth of anaerobic microorganisms.

Nitrogen – inert and stabilizing.

Nitrogen is an inert gas. It is primarily used to replace oxygen in packaging and thereby prevents oxidation. Oxygen is very reactive and inhibits the growth of aerobic microorganisms. Nitrogen also helps to prevent package collapse by maintaining internal volume.

Oxygen – mainly bad, sometimes good.

For most foodstuffs, the package should contain as little oxygen as possible to retard the growth of aerobic microorganisms and reduce the degree of oxidation. Oxygen is required for food and vegetable respiration.

However, there are exceptions. Oxygen helps to preserve the original form of giblet pig, which grows meat and liver. Oxygen is required for food and vegetable respiration.

BOC food-grade gases.

A gas supply adapted to every application.

"Food-grade gas" is a specific definition for gases used in processing and food production in order to ensure that international standards are complied with. BOC supplies a range of gases that conform to "food-grade" regulations, as recommended by Food Standards Australia New Zealand.

Nitrogen and CO₂ are well-known for their properties in MAP. Microbiological growth can also be inhibited to a certain extent with the help of other gases such as argon, hydrogen, or helium.

Each of the gas mixtures has its own unique properties that affect the interaction with the foodstuffs. The gases are used in mixed atmospheres, in suitable proportions by themselves or in combination. This ensures individual gases in cylinders under high pressure, or as liquids in insulated tanks for subsequent mixing at the packaging machine.

Cylinder food-grade gases.

<table>
<thead>
<tr>
<th>Australian Product (Cryogenic)</th>
<th>BOC Product (G-L)</th>
<th>Gas Component (%)</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
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<tr>
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<tr>
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<td>Oxygen</td>
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</table>

Other Wafers can be made to order or prepared on short-term supplies and gas supplies by BOC.