



***Freshline[®] food solutions
Modified Atmosphere
Packaging (MAP)***

What is MAP?

MAP – which stands for Modified Atmosphere Packaging – is a type of food packaging which uses gases found in the air to keep food fresher for longer. It involves removing the air from the package and injecting either one or a mix of gases into food products at lower temperatures.

At the forefront of this innovative process, Air Products' Freshline® Solutions uses unrivalled technical expertise to provide products with optimum shelf life.

Who uses MAP?

Developed to meet the demands of a market driven by a growing consumer preference for fresh, pre-packed convenience foods, MAP is increasingly relied upon by many food processors for not only extended shelf life, but high product quality and improved presentation. As a result of MAP technology, many items of fresh food, from raw meat

and fish, to prepared fruit and vegetables, ready-to-bake breads and pizzas, now come packed in their own modified atmosphere.

What are the benefits of MAP?

MAP offers many advantages to the food packaging industry, including the following:

- Extends shelf-life by 50-500%
- Allows centralised packaging and distribution, alleviating the need for in-store packaging
- Better utilisation of labour and equipment (flattening product peaks and allowing longer packing runs)
- Economies of scale (by purchasing larger quantities of raw materials)
- Enhancement of sales appeal (owing to attractive colour and presentation)
- Sealed packs prevent drip and odours throughout the distribution chain
- Minimises waste/spoilage
- Improved quality (slower deterioration)
- Reduced need for artificial preservatives
- Increased distribution possibilities

***Fact!**

Earth's atmosphere consists of nitrogen (79%), Oxygen (20.96%), Carbon Dioxide (0.04%), traces of inert gases and water vapour. Changing this balance results in a modified atmosphere.

Product	Temperature	Shelf-life
raw red meat	-1°C to +2°C	5-8 days
raw poultry and game	-1°C to +2°C	10-21 days
poultry, dark portion and cuts	-1°C to +2°C	7-14 days
raw fish and seafood	-1°C to +2°C	4-6 days
cooked and cured meats	0°C to +3°C	4-8 months
cooked and cured fish and seafood	0°C to +3°C	7-21 days
cooked cured poultry and game	0°C to +3°C	7-21 days
ready meals	0°C to +3°C	5-10 days
combination products	0°C to +3°C	3-21 days

Components of the system

The MAP system comprises three key components
- machinery, film and gases:

Machinery

Machinery used for MAP includes:

- Vacuum chambers
- Snorkel type
- Tray lidding
- Horizontal & vertical form-fill-seal
- Thermoform-fill-seal

Film

The choice of films used for MAP is largely determined by their gas and water vapour transmission rates.

Materials such as polyester (PET), nylon (PA), polyvinylidene chloride (PVdC) and ethylene vinyl alcohol copolymer (EVOH) provide good gas

barriers, but in many cases poor water vapour barriers.

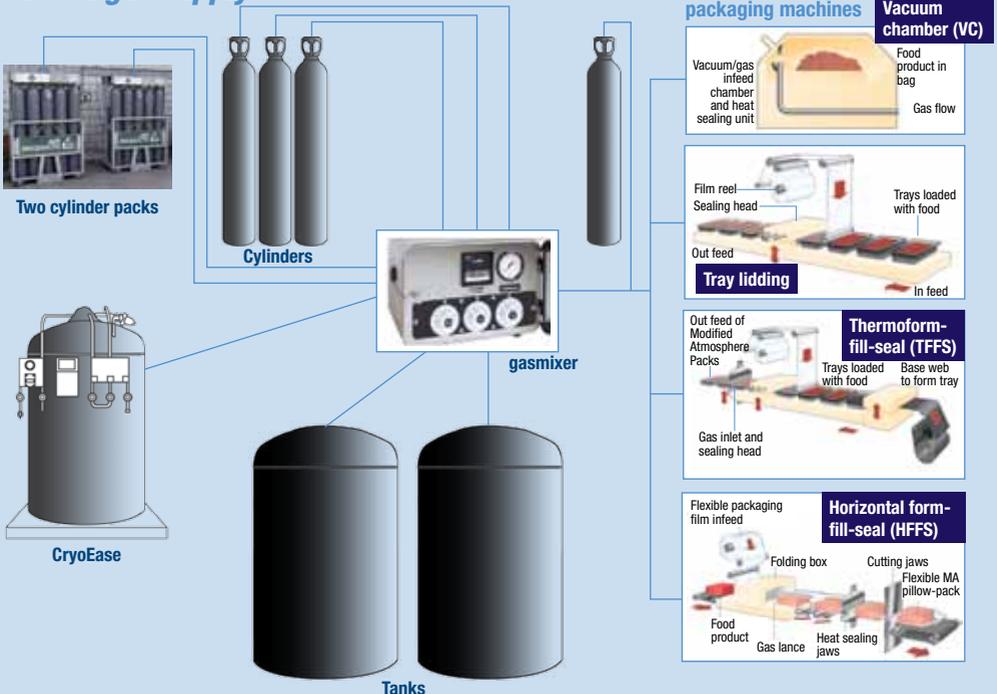
Gases

Pre-mixed Freshline® mixes or pure gases + mixer on site.

Gas supply modes

- **Cylinders**
 - Pre-mixed or pure products
 - Supplied individually or in packs
- **Micro Bulk**
 - Small tank trucks and on-site storage containers
- **Bulk**
 - Bulk liquid gas supplied to a static tank on site which is regularly refilled
- **Onsite Gas Generators**
 - Sited within production facility with a dedicated pipe to points of use

Modes of gas supply



Gas	Properties
CO₂	<p>Inhibits growth of most aerobic bacteria and moulds</p> <p>Higher CO₂ = longer achievable shelf-life</p> <p>CO₂ readily absorbed into high-moisture/fatty foods</p> <p>Excess levels of CO₂ can cause:</p> <ul style="list-style-type: none"> – Tainted flavour – Drip loss – Pack collapse <p>To control bacterial and mould growth, minimum 20% recommended</p>
Nitrogen	<p>Inert gas used to exclude air and oxygen</p> <p>Used as a balance gas (filler) to prevent pack collapse in foods which absorb CO₂</p> <p>Used in snacks and dried products (100%) to prevent oxidative rancidity</p>
Oxygen	<p>Causes oxidative deterioration of foods</p> <p>Required for growth of aerobic micro-organisms</p> <p>Generally O₂ should be excluded</p> <p>However, can be used as follows:</p> <ul style="list-style-type: none"> – Maintain fresh, natural colour (redmeats) – Maintain respiration (fruit & veg)

***Fact!**

Oxygen should not be used in concentrations over 21% unless the packaging machinery is compatible. A guideline document "The safe application of oxygen enriched atmospheres and packaging foods" (BCGA 1998) is available

For more information

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