

## Prepared & catered food. Extending shelf life and increasing flexibility with MAPAX®



Convenience-seeking shoppers want high quality, attractive, “consumer-ready” foods with a long shelf life. Receptive to exotic tastes and eager to try new varieties, these shoppers are prepared to pay premium prices in exchange for minimal preparation. Pizzas, sandwiches, and ready-meals fall into this category. In order to meet this demand, the catering industry must consistently deliver fresh, fine foods with high quality. Producing to order is often employed to satisfy these demands, which could result in a very expensive operation.

The solution lies in highly sophisticated, efficient production and packaging processes that guarantee the taste, appearance, and food safety of these multi-ingredient, value-added foods.

### The challenges

Pre-prepared and catered foods present a complex challenge. Their multiple ingredients increase the potential for deterioration and the varying mixes carry varying risks. For example, if meat is the main ingredient, as in ravioli or lasagna, it spoils in differing manners and rates than pasta.

Spoil is another concern caused by the growth of micro-organisms and by oxidation. It leads to rancidity, discoloration, and loss of taste; food can become stale. For example, a fresh pizza left in the open air at 39 – 43°F will be inedible within a week.

Getting the right carbon dioxide/nitrogen balance is another priority. This balance will vary according to the moisture content and composition of the different ingredients, and can significantly influence the speed of microbial growth, oxidation, and enzyme activity.

### The solution

Linde can reduce these risks associated with multiple-ingredient foods through the MAPAX® brand. Modified Atmosphere Packaging (MAP) is a natural method to extend shelf life without altering the product’s physical or chemical properties. In addition to atmospheric control, Linde can extend shelf-life by providing temperature control, thus providing additional production flexibility.

### Meeting the needs of the catering industry

**The challenge** - Consumers have very high expectations of the catering industry. They demand fresh, appetizing foods that are readily made with little preparation. While production-to-order is a common method for food suppliers to meet this need, it can be inefficient and expensive.

**The solution** - Temperature and atmospheric control during the kitchen or factory production process support a managed and planned production process. It enables caterers to plan ahead, to drive productivity improvement,

and to better control supply chain costs. This increased flexibility also makes it easier to organize storage and distribution needs, while extending product shelf-life and supporting product quality.

In a hotel or restaurant kitchen, modified atmosphere packaging enables efficient production. For example, rather than slicing cheese or meats for the breakfast table on a daily basis, this task can be reduced to once or twice a week. The same applies when preparing fresh meat cuts for the grill.

**The Linde solution: MAPAX®**

MAPAX® brings you a full range of tailored solutions to meet the packaging requirements of the food industries. Our Linde specialists will recommend the most suitable gas, equipment, and safety products for your process, site, and employees.

The MAPAX® gas range has been created to match the special quality requirements of the food industry. They comply with the strict food standards and legislation regarding packaging, storage, and distribution. We can provide the traceability and safety guarantees demanded by the law.

**Food grade gases**

Linde's dedicated field and in-house specialists have in-depth knowledge of the options available to you. We will work with you to develop the right gas mixture for the products being packed.

**Recommended gas mixtures for dry foods and bakery products**

Product	Gas Mixtures	Gas Volume Product volume	Typical shelf-life		Storage temp.
			Air	MAP	
Pizza	30 – 60% CO <sub>2</sub> + 40 – 70% N <sub>2</sub>	0.01 - 0.02 SCF/lb	1 week	3 weeks	36 – 39°F
Pasta	30 – 60% CO <sub>2</sub> + 40 – 70% N <sub>2</sub>	0.01 - 0.02 SCF/lb	1 week	3 weeks	36 – 39°F
Sandwiches	30% CO <sub>2</sub> + 70% N <sub>2</sub>	0.01 - 0.02 SCF/lb	2 days	10 days	36 – 39°F
Ready meals	30 – 60% CO <sub>2</sub> + 40 – 70% N <sub>2</sub>	0.01 - 0.02 SCF/lb	2 days	21 days	36 – 39°F

Linde works closely with the food industry to create and develop leading technologies and applications. Across Linde North America and our parent company, The Linde Group, we have dedicated MAP technical specialists to support and aid each customer. They can advise you on a range of topics including gas mixture selection, achievable shelf-life, and analysis techniques.