

A Koch Equipment White Paper

KOCH

E Q U I P M E N T

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**Understanding Tray Sealing and Modified
Atmosphere Packaging (M.A.P.)**

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Introduction

The purpose of this document is to educate food manufacturers about modified atmosphere packaging (M.A.P.) and how it is used to preserve the freshness and extend the shelf-life of food products to ensure they reach the consumer in optimum condition.

Problem Statement

Consumers are increasingly demanding high-quality food products, and have corresponding expectations that such quality will be maintained at a high level during the period between purchase and consumption. These expectations are a consequence not only of the primary requirements that the food should remain safe, but also of the need to minimize unwanted changes in sensory (primarily sight and smell) quality. While many food manufacturers are using gas flush with their vacuum chamber packaging machine to ensure product preservation and to relieve the crushing affects (e.g., shredded cheese) associated with vacuum packaging, they are not taking advantage of M.A.P. tray sealers/lidders, which offer an attractive presentation using film, foil, or fiber to seal the cover or opening of trays. Additionally, cross-flow gas flushing is less effective, leaving higher residual oxygen levels than gas backfill, which puts gas into a vacuum, thereby filling the void with a desirable atmosphere.

Solution

Whether you are packaging family packs of meat, poultry or seafood, bowls of salad, soup or sauce, sandwich trays, home replacement meals, or produce, M.A.P. can be used to carefully control the atmosphere within the package. This process is the changing of existing atmosphere to an atmosphere more suitable to achieve a specific end result. It is a one-time modification before the package is sealed. However, the atmosphere introduced will go through continued changes depending upon the product being packaged. At which point the mix can no longer be controlled, special films with micro pores or specific permeability properties are used to allow gas to escape from the package. These types of applications are most common with certain produce items that emit carbon dioxide, which will spoil if not allowed to leave the package at a controlled rate.

Aside from the financial and operational benefits of using M.A.P. tray sealing, there are really only three reasons to use M.A.P., including extended shelf-life, product enhancement (color), and the elimination of crushing to preserve the product's quality.

Tray sealers can be used for conventional tray sealing only or as a M.A.P. tray sealer. Our KATS™ automatic tray sealers are capable of both applications. Following is a list of examples in which both are used:

Tray Sealing Only – by hermetically sealing a lidding onto a filled tray with no vacuum and no gas, tray sealing provides:

- A tamper evident/dust cover
- A convenient rigid package
- An attractive package in various shapes and colors
- An automated process
- Product stackability
- Microwavable and/or ovenable packages

M.A.P. Tray Sealing – this application provides all of the features above while improving operations through:

- **Increased centralized processing**
- **Expanded distribution reach**
- **Reduced shrinkage**
- **Increased profits**

Additionally, you can enhance product appearance, such as keeping red meat “red” with high oxygen levels.

The two key drivers of M.A.P. tray sealing are phrases we hear quite often: “meal replacement” and “case ready.” Both are driven by convenience and are great examples of M.A.P. applications with meal replacement providing consumer convenience and case ready providing convenience for the retailer.

Implementation

You need go no further than your local grocer to see M.A.P. in action. You will find fresh ground beef in 1-lb., 2-lb., and 5-lb. barrier containers with hermetically sealed lidding across the top. Fresh pork or fresh Italian sausages are other good examples.

With **red meats**, either low- or high-oxygen levels are used, depending on the application.

Fresh salad mixes also use M.A.P. to extend shelf-life. Typically, a tri-gas (carbon dioxide, oxygen, and nitrogen) mixture is used. In most cases, a special permeable film with micro perforations or a film with a particular gas transmission rate is used to allow the carbon dioxide created by the aging produce to escape the package. Otherwise, it would accelerate the rate of spoilage.

Fresh pasta and non-dairy bakery products derive benefits from high carbon dioxide mixtures that effectively inhibit molds. Other products benefiting from M.A.P. are **poultry, certain cheeses, dried foods, and fruits and vegetables.**

The above examples are intended to provide a general idea of what types of mixtures are used for particular products. We strongly recommend you seek assistance from packaging material and gas suppliers to determine the best atmosphere for your M.A.P. applications.

Summary

We carry a wide variety of KATS™ tray sealers that are designed and engineered to handle an array of food packaging applications and volumes including tray lidding only or those requiring M.A.P. For maximum packaging flexibility, our line of M.A.P. enabled tray sealers cover the spectrum from simple, entry-level tabletop, manually operated machines to high-speed, high volume, inline industrial machines.

The number of packages per index depends on the machine model and tray size. The number of indexes per minute depends on the machine model and options installed.

Our large and industrial-sized KATS™ tray sealers can be equipped with optional features to increase the versatility and efficiency of your packaging line, including:

- Automatic tray denesting unit;
- Volumetric fillers;
- A dosing system for liquid products;
- Coding system(s) for expiration or “sell by” date;
- Package top and/or bottom labeling;
- A gas accumulator for high speed gas compensation; and a
- High oxygen safety valve for high O₂ applications.

Our KATS™ tray sealers are backed by installation and service from our US-based parts and service team and Koch Equipment know-how and dependability—an unbeatable combination that all of our customers experience.