

MAP Gas Mixtures Guide

Modified atmosphere food packaging (MAP) is a widespread application of gases and gas mixtures to maintain the freshness, flavour and appearance of food.





Raw meat and poultry

	Food items	Recommended gas mixtures
Red Meat	Beef, goat, hare, horse, lamb, pork, rabbit, veal.	Retail: 30% CO ₂ , 70% O ₂ Bulk: 35% CO ₂ , 65% O ₂ Primal: 50% CO ₂ , 50% N ₂
Pork	Pork and pork sausages.	Retail: 30% CO ₂ , 70% O ₂ Bulk: 20% N ₂ , 80% CO ₂ Primal: 20% N ₂ , 80% CO ₂
Game	Vension, wild boar.	Retail: 20% CO ₂ , 80% O ₂ Bulk: 20% N ₂ , 80% CO ₂
Offal	Feet or trotters, foie gras, giblets, heart, kidney, liver, neck, oxtail, sweetbread, tongue and tripe.	Retail: 20% CO ₂ , 80% O ₂ Bulk: 20% N ₂ , 80% CO ₂
Poultry	Capon, chicken, duck, goose, grouse, guinea hen, partridge, pheasant, pigeon, poussin/Cornish hen, quail and turkey.	Retail: 30% CO ₂ , 70% N ₂ Bulk: 100% CO ₂
Poultry – Dark portions and Cuts	Dark poultry mince, other skin-off poultry, skin-off chicken, skin-off turkey, sliced dark poultry, turkey mince.	Retail: 30% CO ₂ , 70% O ₂ Bulk: 30% CO ₂ , 70% O ₂

For optimal results, the packaging of fresh red meat and pork requires different MAP gas concentrations for bulk packaging, primal cuts and retail packaging. The most appropriate MAP gas mixture is adjusted to reduce carbon dioxide and increase oxygen at later stages in the supply chain. The carbon dioxide is preferred at early stages to maximise the storage shelf life. The high oxygen concentrations are used at later stages to promote the bright red bloom in the meat. Pork and red meats react differently to the presence of oxygen at high and low concentrations and this is the reason that they require different approaches.



Cooked, Cured and Processed Meat and Poultry

	Food items	Recommended gas mixtures
Meat Products	Bacon, beefburgers, black pudding, charcuterie, chopped pork and ham, cooking sausages, corned beef, frankfurters, haggis, hams, luncheon meats, meat jerky, meat slices, ox tongue, pastrami, pâtés, pepperoni, potted meats, rillettes, roast meats, salami, smoked reindeer, smoked venison, terrines, wurst sausages.	Retail: 30% CO ₂ , 70% N ₂ Bulk: 50% CO ₂ , 50% N ₂
Poultry and Game Bird Products	Capon galantine, chicken ballotine, chicken roll, cured game birds, cured poultry, duck ballotine, duck pâté, duck galantine, pheasant galantine, pigeon galantine, smoked chicken, smoked duck, smoked poussin, smoked turkey, turkey bacon, turkey ballotine, turkey galantine, turkey roll.	Retail: 30% CO ₂ , 70% N ₂ Bulk: 30% N ₂ , 70% CO ₂

Fresh food at Coles supermarkets relies on Coregas (read more – page 6)

Fish and Seafood

	Food items	Recommended gas mixtures
Raw Low Fat White Fish and Seafood	Bream, brill, catfish, cod, coley, croaker, dab, dover and lemon sole, flounder, grouper, haddock, hake, halibut, hoki, huss, jackfish, john dory, mullet, monkfish, pike, plaice, pollack, red snapper, sea bass, shark, skate, snapper, tarakiki, turbot, whiting.	Retail: 30% O ₂ , 30% N ₂ , 40% CO ₂ Bulk: 30% N ₂ , 70% CO ₂
Raw High Fat Oily Fish and Seafood	Bluefish, carp, eel, greenland halibut, herring, mackerel, pilchard, rock salmon, salmon, sardines, shad, sprat, swordfish, trout, tuna, whitebait.	Retail: 40% CO ₂ , 60% N ₂ Bulk: 30% N ₂ , 70% CO ₂
Raw Shellfish, Crustaceans and Molluscs	Abalone, clams, cockles, conch, crab, crayfish, cuttlefish, lobster, mussels, octopus, oysters, prawns, scallops, sea urchins, shrimp, squid, whelks, winkles.	Retail: 40% O ₂ , 30% N ₂ , 40% CO ₂ Bulk: 30% N ₂ , 70% CO ₂
Cooked, Cured and Processed Fish and Seafood	Bloaters, bombay duck, buckling, cod's roe, cold smoked fish, fish galantine, fish rillettes, fish terrines, hot smoked fish, kippers, potted fish, potted shellfish, salt cod, salted anchovies, salted caviar, salted fish roes, salted jellyfish, seafood pâtés, smoked haddock, smoked halibut, smoked mackerel, smoked salmon, smoked trout, taramasalata.	Retail: 30% CO ₂ , 70% N ₂ Bulk: 30% N ₂ , 70% CO ₂

Convenience Food

	Food items	Recommended gas mixtures
Cooked and Dressed Vegetable Products	Bean chillies, bhajis, broccoli in cheese, bubble and squeak, cauliflower cheese, coleslaw, cooked beans and potatoes, corn fritters, garlic mushrooms, lentil cutlets, other dressed salads, pakoras, pasta and potato salads, pilafs, quorn dishes, rice salads, rissoles, stuffed peppers and tomatoes, vegetable bakes, casseroles containing vegetables, vegetable pastas and crumbles, vegetable curries and dosas, vegetable flans, vegetable pilau, vegetable pie, vegetarian burgers.	Retail: 30% CO ₂ , 70% N ₂ Bulk: 50% CO ₂ , 50% N ₂
Ready Meals	Casseroles, ready meals containing fish, ready meals containing game bird, goulash, ready meals containing meat, ready meals containing offal, ready meals containing pasta, ready meals containing poultry, sauces, ready meals containing seafood, soups, ready meals containing vegetables.	Retail: 30% CO ₂ , 70% N ₂ Bulk: 50% CO ₂ , 50% N ₂
Prepared Food	Battered: fish, seafood, meats and poultry; Bouchée/breaded: fish, seafood, meats and poultry; Burritos, enchiladas, falafels, filled crêpes, pancakes and rolls, kebabs, omelettes, pasties, pâtés en croûtes, pizzas, pasta and pies containing meat, poultry, fish and seafood, quiche, roule au fromage, sandwiches, satays, sausage rolls, soufflés, spring rolls, stuffed pitta bread, tacos, tostadas, vol au vents.	Retail: 30% CO ₂ , 70% N ₂ Bulk: 50% CO ₂ , 50% N ₂
Fresh Pasta	Capelli, fettucine, funghini, fusilli, linguine, macaroni, pasta shells, spaghetti, tagliarini, tagliatelle, trenette, tubetti, vermicelli, zitoni.	Retail: 50% CO ₂ , 50% N ₂ Bulk: 50% CO ₂ , 50% N ₂



Dairy Products

	Food items	Recommended gas
Hard Cheeses	Hard cheese excluding mould-ripened cheeses.	Retail: 100% CO ₂ Bulk: 100% CO ₂
Butter, Yoghurt, Cream and Grated /Soft Cheeses	Butter, cream cakes, creams, custards, fresh cheeses, grated cheeses, margarine, sliced cheeses, soft cheeses, yoghurts.	Retail: 30% CO ₂ , 70% N ₂ Bulk: 50% CO ₂ , 50% N ₂

Dried Food and Bakery

	Food items	Recommended gas
Dried Food	Cocoa powders, coffees, dehydrated milk, dried and salted fish, dried and salted seafood, dried beans, dried cereals, dried colourings, dried flavourings, dried fruits, dried herbs, dried lentils, dried mushrooms, dried pasta, dried snack food, dried spices, dried vegetables, flours, nuts, potato crisps, teas.	Retail: 100% N ₂ Bulk: 100% N ₂
Bakery Products	Bagels, bread puddings, breads, buns, cheesecakes, crêpes, croissants, crumpets, danish pastries, fruit breads, fruit cakes, fruit pies, fruit strudels, fruit tarts, meringue cakes, muffins, nan bread, nut breads, pancakes, par-baked breads, pitta bread, pizza bases, pretzels, sponge layer cakes, swiss rolls, taco shells, tortillas, vegetable breads, waffles.	Retail: 50% N ₂ , 50% CO ₂ Bulk: 30% N ₂ , 70% CO ₂

Fresh Food and Vegetables

Food items

Fresh Foods

Apples, apricots, artichoke, asparagus, aubergine, avocado, bananas, bean sprouts, beetroot, beans, broccoli, cabbages, carrots, celery, cherries, cucumber, cumquats, fennel, garlic, citrus fruits, grapes, guava, kiwi fruit, leek, lettuces, lychees, mango, marrow, melons, fruit and vegetable salads, okra, onions, other sprouts, papayas, parsnips, passionfruit, peaches, pears, peas, peppers, pineapple, plums, potatoes, radish, rhubarb, spinach, star apples, strawberries, other berries, sweetcorn, tomatoes.

Recommended gas mixture for Optimal Equilibrium MAP with laser perforated foil

Retail: 5 % O₂, 5% CO₂, 90% N₂
 Bulk: 5 % O₂, 5% CO₂, 90% N₂



Modified atmosphere food packaging (MAP) is a widespread application of gases and gas mixtures to maintain the freshness, flavour and appearance of food in the supply chain and retail outlets. At Coles, and other supermarkets in Australia and New Zealand, you will find many meats, dairy products and dried groceries that have been packed using MAP gas mixtures from Coregas.

Beverages

Food items

Recommended gas

Liquid Foods and Beverages

Cordials, fruit juices, liqueurs, liquid yoghurt, milk, mineral waters, oils, spirits, vegetable juices, wines.

Retail: 100% N₂
 Bulk: 100% N₂

Carbonated Drinks

Cider, carbonated soft drinks, most lagers and some beers.

Retail: 100% CO₂
 Bulk: 100% CO₂

Recommended gas mixture

Smoothflow Stout and Beer

Smoothflow beers such as Guinness and Kilkeny.

Retail: 30% CO₂, 70% N₂
 Bulk: 30% CO₂, 70% N₂

Stouts, Beers and Lagers

Smoothflow beers such as Guinness and Kilkeny, stout, some beers and lagers.

Retail: 45% N₂, 55% CO₂
 Bulk: 45% N₂, 55% CO₂



Special Applications

Food items

Recommended ripening gas mixtures

Fruit ripening

Bananas, citrus fruits, kiwi fruit, passionfruit, mango, persimmon, nectarines, plums, avocados, apricots, papaya, grapes, water melon, tomatoes.

4% Ethylene, 96% N₂

Recommended propellant gas

Whipped Cream

Cream.

100% N₂O

The typical package would be tray-sealed and thermoformed packages for most retail food applications. Tubs and pots are commonly used for retail dairy products such as yoghurts, soft cheeses, margarine and cream. Flow packages and cans are typical for dried products such as milk powder or coffee. Steel tanks and barrels dominate for bulk use. Bag-in-box or master pack would be typical for bulk and primal scale use.

For liquid foods and beverages, Carton board gable-top containers, glass and plastic bottles, aluminium and steel cans are typical for retail applications. Kegs, stainless steel tanks and barrels dominate for bulk use.



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Wesfarmers

Coregas – a Wesfarmers company