

# Friendly Agricultural Solutions

Derived from nature's components

*Efficient fumigation to ensure quality produce*

BOC Agricultural Solutions range includes:

- **Vapormate™**: A highly effective fumigant made from food ingredients designed to leave produce and manufacturing equipment insect free from as quickly as 3 hours after exposure
- **FOGG™**: Natural carbon dioxide gas used for enrichment in greenhouses and pest control
- Plus other products including **Ripegas™** which is used for the ripening of post-harvest produce



**Vapormate™**  
is a fast and  
highly effective  
fumigant which  
leaves produce  
insect free

## What is Vapormate™?

Vapormate™ is a newly developed fumigant from BOC which was designed as an alternative to the ozone depleting Methyl Bromide. Vapormate™ is a non-flammable, non-toxic mixture which contains ethyl formate. Ethyl formate is a Generally Recognised As Safe (GRAS) food additive and breaks down readily to naturally occurring compounds.

## What is Vapormate™ used for?

- Application to horticultural produce post harvest including fruit, vegetables and cut flowers
- Fumigation of grain storage
- Fumigation of food processing equipment

## Vapormate™ vs Methyl Bromide

Features & Benefits	Vapormate™	Methyl Bromide
Restrictions upon sale	Y	Y
Ozone depleting active ingredient	N	Y
Effective from 3 hours	Y	N
Internationally patented technology	Y	N

## Guide to Application Rate: Australia\*

Situation	Insects	Application Rates
Cereal grains and oilseeds in sealed storage (with moisture content ≤12%)	Complete control of all stages of: Lesser grain borer ( <i>Rhyzopertha dominica</i> ), Flour beetle ( <i>Tribolium castaneum</i> ), Psocids (various species), Storage moths ( <i>Esphestia</i> spp., <i>Plodia</i> spp.), Sawtoothed grain beetle ( <i>Oryzaephilus</i> spp.), Flat grain beetle ( <i>Cryptolestes</i> spp.)	660g/m <sup>3</sup> held for 3 hours exposure time
Grain storage premises and equipment	Complete control of eggs, larvae and adults of: Rice weevil ( <i>Sitophilus oryzae</i> )	420g/m <sup>3</sup> held for 24 hours exposure time
Horticulture produce (post harvest only) fruit, vegetables, flowers in sealed storage	Pacific spider mite ( <i>Tetranychus pacificus</i> ), Western flower thrips ( <i>Frankliniella occidentalis</i> ), Omnivorous leafroller ( <i>Platynotastultana</i> ), Aphids (e.g. <i>Macrosiphum euphorbiae</i> ), Mealybugs ( <i>Pseudococcus longispinus</i> )	420 g/m <sup>3</sup> held for 4 hours exposure time

\*Please refer to product label for further details.

For New Zealand application rates, please refer to the NZ Agricultural Compound and Veterinary Medicines product label.



*FOGG™ is a safe natural gas used for enrichment in greenhouses and pest control*



Bulk carbon dioxide installation next to a greenhouse

## What is FOGG™?

FOGG™ is an agricultural grade carbon dioxide that can be effectively delivered for greenhouse enrichment without the common side effect of producing gases toxic to plants caused by burning fuel. FOGG™ is produced to extremely strict standards at a purity of 99.5%, meaning it will not form moisture in a greenhouse atmosphere. FOGG™ enhances the quality of produce and flowers to be bigger and better. It is available in cylinders and bulk onsite installations.

## What is FOGG™ used for?

- Greenhouse enrichment of plants and flowers
- Dispensing propellant for pesticides
- Purging gas lines from pesticides and remove blockages

## FOGG™ for crop enrichment

Carbon dioxide is commonly used in the United States and Eastern Europe for crop enrichment in greenhouses. Studies and experiments for over 20 years have indicated significant increases in the growth of a wide range of crops. Crops that have demonstrated benefits from using carbon dioxide in enclosed greenhouses include:

- Tomatoes
- Cucumbers
- Lettuce
- Eggplants
- Gerberas
- Roses
- Carnations

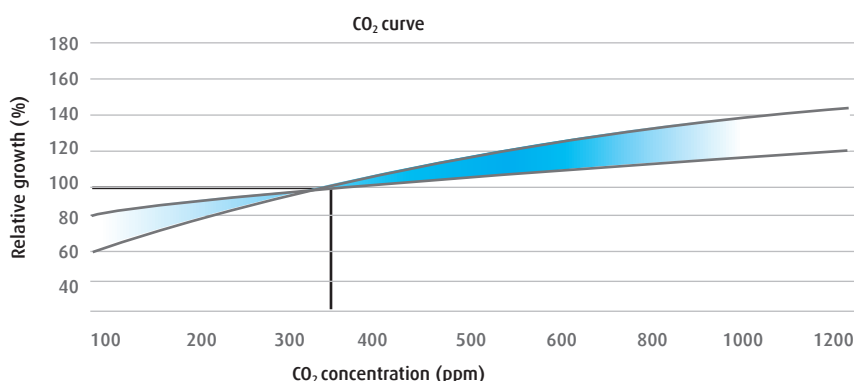
## Guide to application rates

Crop	Yield increase at doubled CO <sub>2</sub> (%)
Cotton	82
Black-eyed pea	78
Sweet potato	45
Soybean	36
Sorghum	31
Corn	10

Source: Roger C Dahlman, 1993

## CO<sub>2</sub> concentration vs relative growth

During plant respiration levels of CO<sub>2</sub> within a greenhouse can drop below ambient levels of 350ppm, resulting in the reduction of plant growth. The addition of CO<sub>2</sub> above ambient levels will improve crop yield as demonstrated in the graph below.



Source: Nederhoff, 1994





*Providing innovative solutions to move  
your business ahead*

## Fumigant specifications

	Vapormate™	FOGG™	CO <sub>2</sub> Bulk Agricultural
Gas Code Australia	Vapormate™: 279	FOGG™: 200	748
Gas Code New Zealand	Vapormate™: 279C	Carbon Dioxide Industrial Grade: 169C	748BLK
Active Ingredient	Ethyl Formate Propellant : Carbon Dioxide	Carbon Dioxide	Carbon Dioxide
AUS Cylinder Size/Content	DE-6.0kg FSE-22.0kg FE-27.0kg	D-6.0kg G-31.0kg	1mt Vessel weight 2,300kg 2.5mt Vessel weight 2,900kg
NZ Cylinder Size/Content	DE-6.0kg FE-27.0kg FSE-22.0kg	D-6.8kg E-10.0kg G-33.0kg	6mt Vessel weight 5,200kg 12mt Vessel weight 9,900kg
Cylinder Pressure	6300kpa	5000kpa	VIE 1500 – 1870kpa VIE 3000 – 1900kpa VIE 7000 – 1900kpa VIE 15000 – 1900kpa

## Dispensing Equipment

Type	Vapormate™	FOGG™
Manual Dispensing	416651 Spray Gun Kit 730013 Crack and crevice nozzle 730014 Crack and crevice insert	736635 Pestigas™ Manual Spray Kit
Automatic Dispensing	736682 Solitaire Automated System 736699 Vapormate Vaporiser - Fresh 736698 Vapormate Vaporiser - Turbo	301793 COMET™ 500 CO2 Greenhouse Kit

*BOC can also provide tailored solutions for your business.  
Please call 131 262 for further information.*

For all your gas, welding and safety needs, please contact:

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