



PHANTOM[®]

INSECTICIDE

Technical Manual

INTRODUCTION

Phantom[®] Insecticide is the latest product to join the BASF Pest Control Solutions stable of products in Australia. **Phantom** contains the active ingredient chlorfenapyr which belongs to the pyrrole class of chemistry. Derived from a natural product, it was discovered in 1985 following the isolation of a toxin from the *Streptomyces fumanus* actinomycete bacterium.

Phantom has a broad spectrum of activity and is particularly effective on cockroaches, ants and bed bugs in commercial and residential situations around the world.

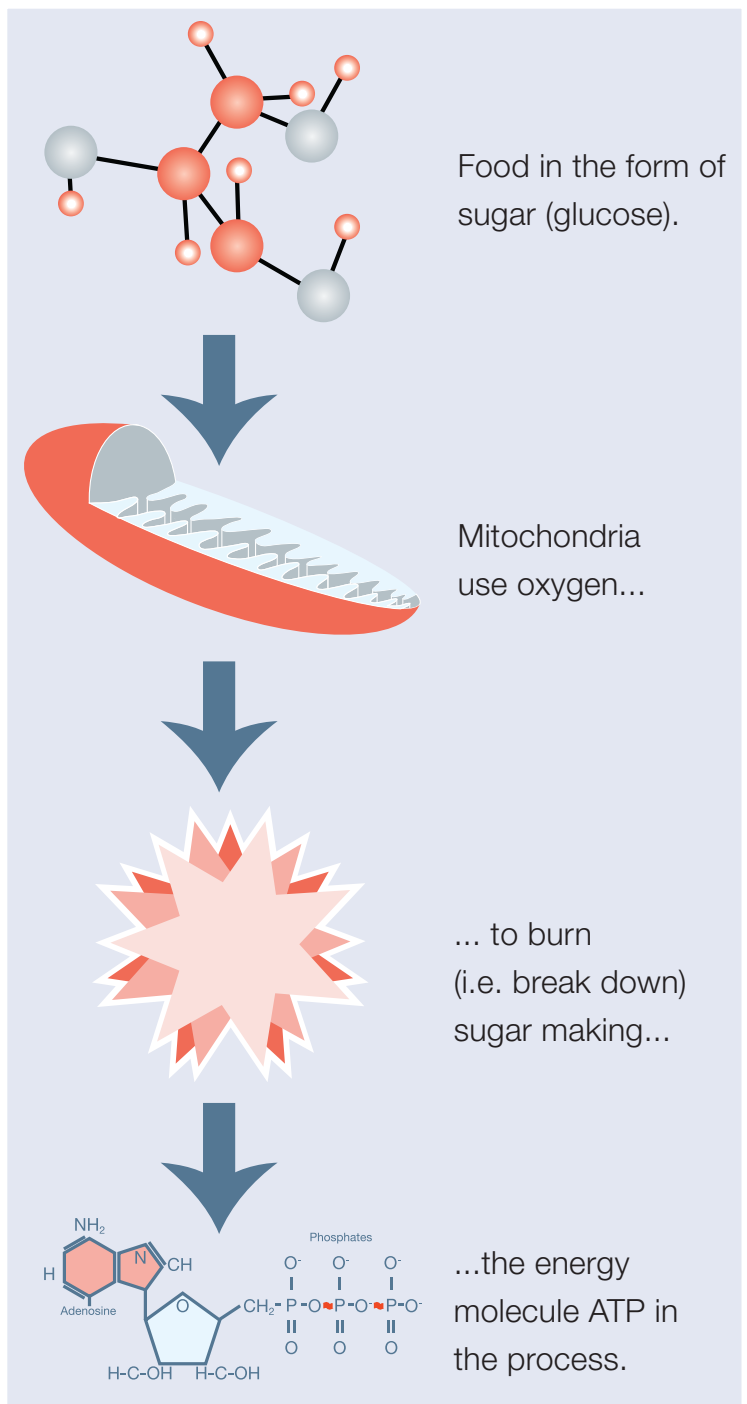
NEW MODE OF ACTION

The mode of action of **Phantom** is unique among insecticides. The active ingredient is a pro-insecticide which is converted to its active form by mixed-function oxidases (MFO) in insects. This active form targets the mitochondria within cells throughout the insect's body.

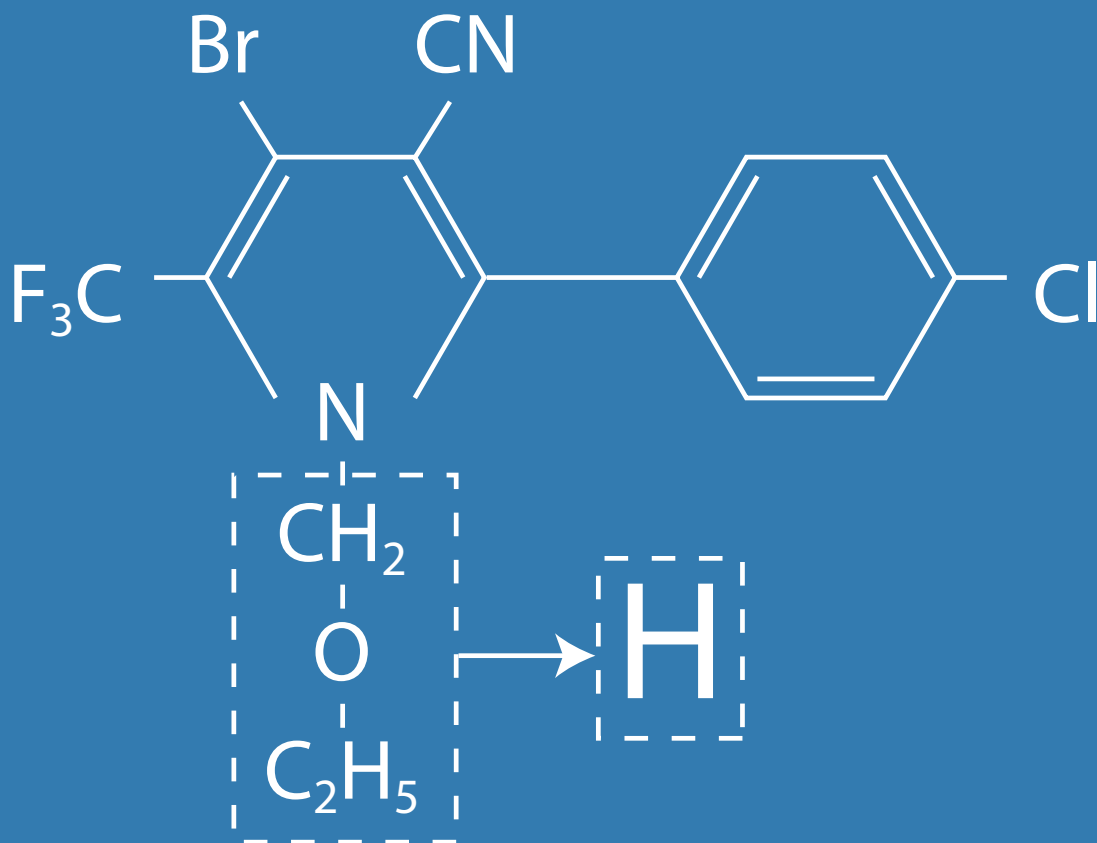
An important process which occurs in the mitochondria is the conversion of adenosine diphosphate (ADP) to adenosine triphosphate (ATP) via a process known as oxidative phosphorylation. ATP is chemical energy which allows cells to sustain their vital functions. Internally, mitochondria accumulate high-energy H⁺ protons. These protons serve as the energy sources to drive mitochondrial reactions such as oxidative phosphorylation.

Chlorfenapyr lodges between inner and outer membranes of the mitochondria, where it then facilitates H⁺ proton loss by pulling them from inside the mitochondria and releases them outside. Mitochondria can no longer accumulate H⁺ protons internally; subsequently, they become "uncoupled" and can no longer generate ATP. Without ATP, cells cease functioning and the insect eventually dies.

Due to its unique mode of action, **Phantom** is very effective against pests that are resistant to organophosphates, carbamates, pyrethroids, and chitin-synthesis inhibitors. No instances of target site cross-resistance have been observed anywhere in the world.



PHYSICAL AND CHEMICAL PROPERTIES



ACTIVE INGREDIENT:

BSI Common Name	CHLORFENAPYR
Chemical Family	Pyrrole
CAS Number	122453-73-0
Chemical Name	4-bromo-2-(4-chlorophenyl)-1-(ethoxymethyl) 5-(trifluoro-methyl) pyrrole-3-carbonitrile (IUPAC) 4-bromo-2-(4-trifluoromethyl)-1H-pyrrole-3- carbonitrile (CA)
Empirical Formula	C ₁₅ H ₁₁ BrClF ₃ N ₂ O
Molecular Weight	407.6
Melting Point	100 - 101°C
Vapour Pressure	<1.0 x 10 ⁻⁷ mm hg at 25°C
Solubility	Practically insoluble in water

PHANTOM FORMULATION:

Appearance	Light brown colour
Odour	Sweetish
pH	Approx. 6.9

BIOLOGICAL ACTIVITY

Phantom[®] Insecticide is highly effective on ants, cockroaches and bed bugs by ingestion (primary) and contact (secondary) activity. The key important and unique physical property of **Phantom** is that it is undetectable to pests. This means they will not avoid the treatment and will travel through the treated areas and unknowingly pick up a lethal dose.

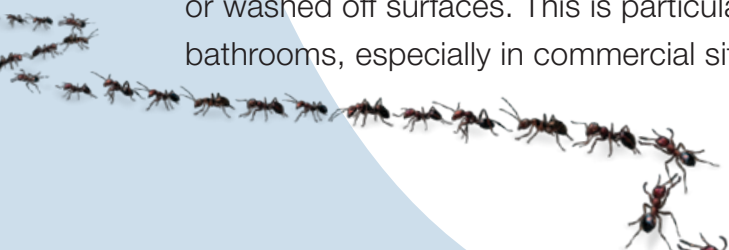
Cockroaches and ants consistently groom themselves and by using this natural behaviour, **Phantom** makes its way into the insect's body. Once ingested, **Phantom** attacks pests from inside their own bodies by preventing their cells from generating energy. This leads to paralysis, and, ultimately death.

However, this process is not instantaneous which means **Phantom** has a delayed-action mortality and will not cause an accumulation of dead ants or roaches in a particular spot. Instead, they continue to behave normally and go about their regular routines for a short time before dying.

Other products contain ingredients that are detectable to these pests. Treating with those products can actually repel pests - locking them into a specific area or just make them a problem elsewhere in the room being treated. Thus the Pest Control Operator will often try and spray as many areas as possible in the attempt to completely flush them out of the structure. This means much higher volumes of chemicals used and longer treatment times for the Pest Control Operator.

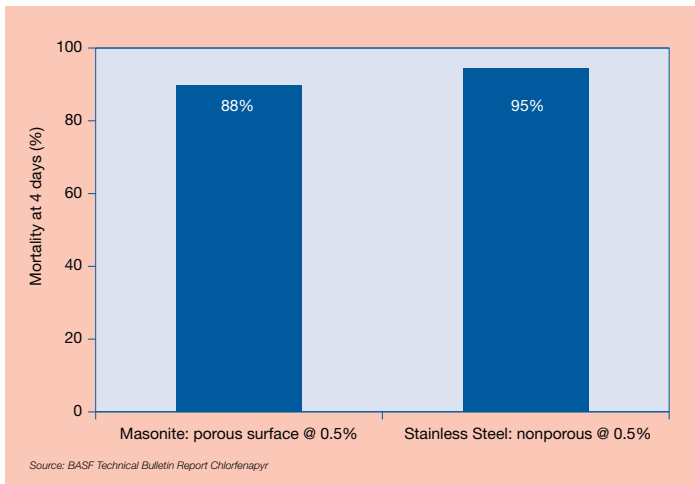
Because **Phantom** is undetectable to the pests, the treatment is professionally targeted to cracks, crevices and harbourages which means much less chemical is used and the treatment can be completed in less time. Also you can't effectively use gels or baits in areas where a repellent spray is being used. Whereas with **Phantom**, this is recommended as part of an integrated pest management approach which is much more professional and efficacious. **Phantom** also has a very low odour making it a perfect fit for sensitive situations such as motel rooms, kitchens etc.

Phantom has a long residual life on all internal surfaces. One of the reasons for this is the fact that **Phantom** has very low water solubility which means it will not be easily wiped or washed off surfaces. This is particularly important in wet areas such as kitchens and bathrooms, especially in commercial situations.



TRIAL RESULTS

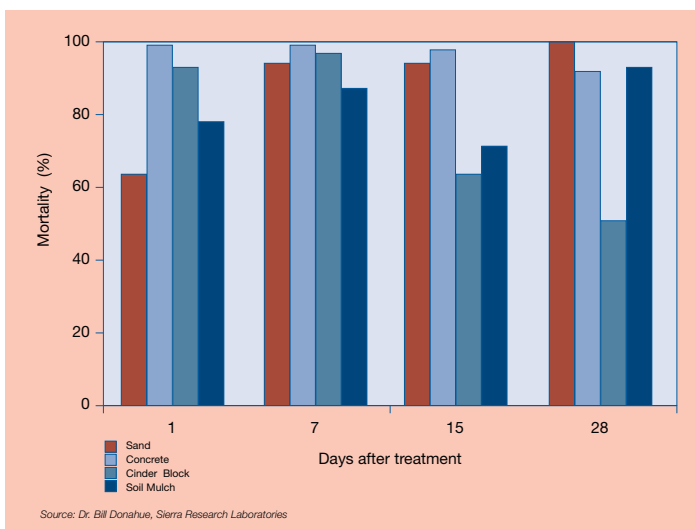
Residual activity of chlorfenapyr against German cockroaches (1-hour exposures)



Male German cockroaches were exposed to treated surfaces for 1 hour before being transferred to clean jars for observation of mortality.

After 4 days, **Phantom** provided excellent German cockroach control at 88% on a porous masonite surface, and 95% control on a nonporous stainless steel surface.

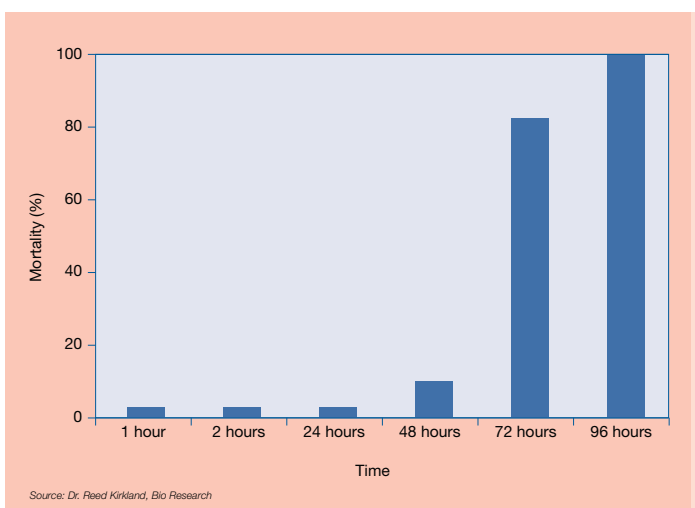
Residual control of Argentine Ants with Phantom on different substrates



Phantom (at 0.5% dilution) was applied as a spray on different surfaces (substrates) that ants traverse (4 hour exposure).

Results showed effective Argentine ant control with no dramatic difference in **Phantom** performance on different substrates.

Phantom Direct Spray Bed Bug Trial






Phantom (at 0.5% dilution) was applied as a direct spray treatment onto 10 bed bugs. This was replicated 4 times.

Results showed 100% mortality after 96 hours.

LABEL DIRECTIONS



SITUATION	PEST	RATE	CRITICAL COMMENTS
<p>Internal applications in domestic, commercial industrial and public buildings: including food processing establishments, shops, factories, ships, offices, schools, storerooms, hospitals, barracks and houses.</p>	<p>Cockroaches</p> 	<p>25mL/L</p>	<p>Apply as a coarse, low pressure spot, harbourage and crack and crevice spray at a rate of 1L of spray solution per 20m² up to but not exceeding the point of runoff. Where use of a spray is not suitable, it is recommended a registered gel product, such as GOLIATH[®] Cockroach Gel, be applied according to the registered label. PHANTOM[®] has been shown to be non-repellent to some species of ants and cockroaches, and is suitable for use in IPM programs with baiting and gel products according to the registered label.</p>
	<p>Ants</p> 		<p>Where possible, apply directly to foraging ants. Apply as a coarse, low pressure surface spray at a rate of 1L of spray solution per 20m² up to but not exceeding the point of runoff. Use on particularly porous surfaces may result in a lower level of control. Use in conjunction with a an exterior ant treatment, such as TERMIDOR[®] Residual Termiticide and Insecticide, is recommended to prevent ants re-entering the treated building.</p>
	<p>Bed Bugs</p> 		<p>Treat affected room by applying Phantom directly to bed bug activity as a spot treatment. Apply the spot treatment directly to bed bugs at a rate of 1L of spray solution per 20m² up to but not exceeding the point of runoff on skirting boards, carpet edge, cracks, crevices, in and behind bed heads and bed frames, bedside tables and cupboards. An IPM approach should be followed for the control of bed bugs. For more information refer to the Code of Practice for the Control of Bed bug Infestations in Australia.</p>

NOT TO BE USED FOR ANY PURPOSE OR IN ANY MANNER CONTRARY TO THIS LABEL UNLESS AUTHORISED UNDER APPROPRIATE LEGISLATION.

SUMMARY

BASF Pest Control Solutions is proud to bring a new active ingredient into Australia. Chlorfenapyr is a proprietary insecticide which belongs to the pyrrole class of chemistry and brings with it a unique mode of action.

Phantom also has some unique properties which make it unlike any other general pest control product on the Australian market. Properties such as:

- Non-repellant – it is undetectable so pests can't smell it, taste it or avoid it
- Delayed-action mortality – ensures pests gain maximum exposure
- Targeted – apply to cracks, crevices and harbourages (uses less time and chemical)
- Low odour – perfect for sensitive areas like motel rooms, commercial kitchens etc
- IPM – can be used with cockroach and ant gels in an IPM approach
- Long residual – long chemical half life
- Low water solubility - it will not be easily wiped or washed off treated surfaces

It must be stressed that **Phantom** is not a flushing agent and will control insects within a few days of application. **Phantom** will not cause target pests to act erratically and scatter over treated surfaces nor push them into previously uninfested harbourages, for example - German cockroaches in kitchens and bedbugs in accommodation facilities and bedrooms.

Due to its unique mode of action, **Phantom** controls pests resistant to other insecticide chemical classes.

Always read the registered label before using.



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Product Information Hotline: Free Call 1800 006 393

www.termidor.com.au

Always consult the product label before use.

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