Competent Authority Report Public version * * * * * * * * * * SULFURYL FLUORIDE/VIKANE (PT8) DOCUMENT III-B5 Intended Uses and Efficacy

Rapporteur Member State: Sweden

May 2005



Table of Contents; DOC III-B5

B5.1 – B5.11 Intended uses and efficacy	3
B5.10 Efficacy data:	
B5.10.2/01	16
B5.10.2/02	25
B5.10.2/03	33
B5.10.2/04	
B5 10 2/05	51
B5 10 2/06	59
B5 10 2/07	67
B5 10 2/08	76
B5 10 2/09	86
B5 10 2/10	94
B5 10 2/11	102
B5 10 2/12	102
B5 10 2/13	109
B5.10.2/15	110
B5.10.2/14	127
D5.10.2/15	1/2
B5.10.2/10	142
$D_{2}(1) = \frac{1}{2} \int \frac{1}{2} \int \frac{1}{2} \frac{1}{2} \int \frac{1}{2} \frac{1}{2} \frac{1}{2} \int \frac{1}{2} \frac$	150
D5.10.2/16	139
D5.10.2/19	100
D5.10.2/20	170
D5.10.2/21	104
D3.10.2/22	191
B3.10.2/23	198
B5.10.2/24	205
B5.10.2/25	212
B5.10.2/26	219
B5.10.2/27	226
B5.10.2/28	233
B5.10.2/29	240
B5.10.2/30	247
B5.10.2/31	254
B5.10.2/32	260
B5.10.2/33	266
B5.10.2/34	271
B5.10.2/35	276
B5.10.2/36	281
B5.10.2/37	286
B5.10.2/38	293
B5.10.2/39	300
B5.10.2/40	307
B5.10.2/41	314
1. List of studies sorted by Section number and Reference number	319
2. List of studies sorted by Author	330

Dow AgroSciences	April 2004
RMS: Sweden	

Section Annex	on B5 x Point IIB, V.	Intended uses and efficacy	
Subs (Anno	ection ex Point)	Introduction	Official use only
		To obtain efficacy data on wood destroying pests is problematic. There are few specialized research organizations and few pest cultures maintained. Obtaining natural sources for testing may also prove difficult. Some species and life stages are especially challenging to raise in sufficient quantities for effectiveness studies. Despite these challenges much laboratory and field data has been collated to demonstrate the efficacy of sulfuryl fluoride in controlling important wood destroying pests.	
		The active substance sulfuryl fluoride was originally developed by The Dow Chemical Company in the late 1950s as the product Vikane* gas fumigant to control wood destroying insects in structures. The product is currently registered for use in the USA, Caribbean Islands, Japan, Norway, Finland and Sweden, and is authorised for use in Germany. Since its introduction in 1961 Vikane has been used to fumigate more than one million buildings including residential homes, churches, museums, historical landmarks, rare book collections, scientific and medical research laboratories. The product is also used to fumigate shipping containers and also vehicles except aircraft and subsurface water vessels.	
		*Trademark of Dow AgroSciences	
5.1	Product type(s) and field(s) of use envisaged (IIB5.1)	Fumigant for the control of wood destroying pests in wooden structures/rooms (e.g. churches, houses) and of wooden objects/timber in fumigation chambers, shipment containers and in stacks under tarpaulins (e.g. plastic sheets).	
5.1.1	Product type(s)		
	MG02: Preservatives	Product type PT 8.02	
	Further specification	Other wood preservatives (with curative action)	
5.1.2	Overall use pattern	Curative treatment by fumigation conducted only by professional licensed and trained fumigators.	
		Use pattern is as described in the OECD – PT8 - Environmental Scenario Document (ESD) part 4, Appendix 7:	
		"The wood treated with gases in contained rooms: fumigation chambers, shipment containers, plastic sheaths, sealed rooms"	
		Fumigation of wooden structures/rooms (e.g. churches, houses) and of wooden objects/timber in fumigation chambers, shipment containers and in stacks under tarpaulins.	

Section B5 Annex Point IIB, V.		Intended uses and efficacy	
5.2 Method of application including description of system used (IIB5.2)	Wood preservation covers a range of scenarios which include structural fumigation (e.g. churches, houses), chamber fumigation of wooden objects (e.g. wood artefacts, furniture), shipment containers and stacks under tarpaulin (e.g. wood packaging material, timber).		
	(IIB5.2)	Similar work place activities occur with each scenario. In the case of structural fumigation, the structure has to be made as gas tight as possible by sealing all openings (e.g. windows, doors). The fumigant is then introduced and following the required exposure period the structure, chamber container and fumigated material is then aerated. Re-entry into the area where the fumigation occurred occurs following clearance of the fumigant.	
		Sulfuryl fluoride is transported in a cylinder as pressurised liquid. It is introduced in the structure, chamber, container or stack under its own pressure via suitable tubing e.g. polyethylene or nylon, connected to the cylinder which leads to the point of volatilisation, where the sulfuryl fluoride is dispersed.	
5.3	Application rate and if appropriate, the final concentration of the biocidal product and active substance in the system in which the preparation is to be used, e.g. cooling water, surface water, water used for heating purposes (IIB5.3)	 <u>Maximum concentration</u> The dosage is the product (P) of concentration (C) x exposure time (T) product abbreviated as CTP. The maximum concentration is 128 g/m³ with no restriction for exposure time. The 128 g/m³ was proposed by Dow AgroSciences to establish a limit that would provide the required flexibility for fumigators for practical fumigations. The required exposure period for fumigations vary, for some there may be a significant time constraint and a short exposure time is needed and therefore a higher concentration to achieve the target dosage. For others, where there is no time constraint a longer exposure time can be used with a corresponding reduction in the required concentration. It was considered necessary 	
		to have a concentration limit to avoid excessively high concentrations being used. The 128 g/m ³ proposed for the biocidial use of sulfuryl fluoride is in accord with that proposed for its non-biocidial use. <u>Dosage description</u> Vikane is the active ingredient (99.8 % of sulfuryl fluoride), there is no formulated product. The dosage i.e. the CTP (concentration x time product) measured in g h/m ³ is dependent on the pest species, the life stage and the temperature. The toxicity of sulfuryl fluoride is highly influenced by temperature. Increasing the temperature reduces the dosage required for all pest life stages. For post-embryonic life stages this is due to the increased rate of respiration with temperature rise. With the higher rates of respiration a higher amount of sulfuryl fluoride enters the insect pest via the spiricales and is metabolised at a faster rate. For eggs sulfuryl fluoride enters via diffusion. Studies reported in the dossier have shown that the insect pest egg susceptibility to sulfuryl fluoride may vary according to egg age. By increasing the temperature the development time for eggs shortens and more susceptible egg ages are reached in a faster time reducing the dosage required. Fumigant dosages are properly calculated as the product of fumigant concentration (c) x exposure time (t) = CTP given in g h/m ³ .	

Section B5	Intended uses and efficacy	
Annex Point IIB, V.	Intended uses and efficacy	
	However, in pest control practice, fumigate simplified target dosages to a rate in g/m^3 for phosphine. This approach has the signi accounting for variable gas loss rates. The loss rate slower than planned) or underdosi than planned) in many situations.	ors generally have for methyl bromide and ficant flaw of not result is overdosing (gas ng (gas loss rate was faster
	The proposed Vikane label does not provid the Vikane Fumiguide calculator(s) are req target dosage. The dosage will be specific incorporating the biological factors to deter retention rate to determine the initial target structure volume is then factored in to deter of fumigant required for this specific target period and environmental conditions.	te target dosages because uired to determine the to each fumigation rmine dosage, and the gas concentration. The rmine the amount (weight) species, site, exposure
	Dosage requirement For fumigation to control wood destroying Fumiguide calculator(s) are to be used for t fumigant rates with the parameters of temp pest, exposure period, and fumigant loss rat time (HLT). The HLT is a measure of gas as the time in hours taken for the concentrat reduce by 50%.	pests, the Vikane the coordination of erature at the site of the te measured as half-loss- confinement as is defined tion of sulfuryl fluoride to
	To simplify the use of the Vikane Fumiguid the input of the parameters, the dosage is pr drywood termites. Dosages for other pests multiple of this value. These multiplication table below:	de calculators, following rovided for a single pest - are then calculated as a n factors are given in the
	Pest Dos	age Factor
	(as a multiple o	f drywood termite dosage)
	Formosan termites	
	(Coptotermes formosanus)	X4
	Powder post beetle (Lyctus brunneus) –Non egg stages Egg stage	X4 X15
	Common furniture beetle, house borer, wood worm (<i>Anobium punctatum</i>) – Non egg stages Egg stage	X4 X20
	House longhorn beetle, European house borer, old house borer (<i>Hylotrupes bajulus</i>) - Non egg stages Egg stage	X4 X20
	Pine wood nematode (<i>Bursaphelenchus xylophilus</i>) – All stages	X20

Section B5 Annex Point IIB, V.	Intended uses and efficacy		
	The Fumiguide B Calculator was used for to coordinate fumigant rates with temperate exposure period, and an estimated half loss with sulfuryl fluoride in the EU will have to written in the ProFume/Vikane Gas Fumig Policy for Fumigators and Distributors (em- Documentation (additional documents)".	unmonitored fu ures, a 20 to 24 s time. All fum o be monitored ant European S closed in "Oth	umigations 4 hour igations 1, as it is Stewardship er
	The Fumiguide Y Calculator is used in con B when fumigant concentrations are monit period is not 20-24 hours.	junction with a ored and/or the	Fumiguide e exposure
	The electronic Fumiguide Calculator is a h which performs the functions of both the F calculators.	and held micro umiguide B an	pprocessor Id Y
	A worked example to establish the correct Vikane needed using the Fumiguide Y is g	dosage and the iven as follows	e amount of 5:
	Parameters: Half loss time = 12 hours, exp temperature = 25° C, structure volume 20,0	osure time = 4 00 m ³ .	8 hours,
	Pest	$\frac{\text{Dosage}}{\text{g-h/m}^3}$	<u>KG</u> Vikane
	Drywood termites	78 (X)	94.10
	Formosan termites (Coptotermes formosanus)	312 (4X)	376.44
	Powder post beetle (<i>Lyctus brunneus</i>) – Non egg stages Egg stage	312 (4X) 1170 (15X)	376.44 1411.50
	Common furniture beetle, house borer, wood worm (<i>Anobium punctatum</i>) – Non egg stages Egg stage	312 (4X) 1560 (20X)	376.44 1882.00
	House longhorn beetle, European house borer, old house borer (<i>Hylotrupes bajulus</i>) – Non egg stages Egg stage	312 (4X) 1560 (20X)	376.44 1882.00
	Pine wood nematode (Bursaphelenchus xylophilus) - All stages	1560 (20X)	1882.00

Section B5

Intended uses and efficacy

Annex Point IIB, V.

5.4 Number and timing of applications, and where relevant, any particular information relating to geographical variations, climatic variations, or necessary waiting periods to protect man and animals (IIB5.4)

Application number and fumigation timing

For duration of the application i.e. the time that sulfuryl fluoride remains effective after fumigation, the following comments are made. Following a successful fumigation the infestation of the destroying insect pest would be eradicated. For some uses e.g. fumigation of imported wood packaging material to control quarantine pests one fumigation is required. Since sulfuryl fluoride has no residual activity re-infestation of wood destroying insects e.g. wood artefacts or wood within buildings could occur and further fumigations may be needed. In practice because of the long life cycle of many of the pests and the slow build up of an infestation occurs. This is certainly the situation with the current use of sulfuryl fluoride in Germany for the disinfestations of wood destroying insects from churches.

Regarding duration of the application i.e. the exposure period, although there is no upper limit in practice fumigation the majority of exposure periods would be within a 72 hour period.

A single fumigation may achieve complete disinfestations of wood providing conditions are suitable. Higher temperatures improve the effectiveness of sulfuryl fluoride. The reason why temperature has such a significant effect on fumigant effectiveness can be explained mostly by its effect on the rate of respiration of the pest. As temperature decreases, the respiration rate decreases, reducing fumigant uptake. Therefore fumigant dosage must be increased as temperature at the site of the target pest decreases. In addition to respiration temperature also affects the rate at which an insect develops. This is important in relation to insect life stages that may be less susceptible to the fumigant than others. Insect eggs are the most tolerant stage to sulfuryl fluoride. The level of tolerance can also depend on the egg age. At higher temperatures the egg stage is completed faster compared to lower temperatures and therefore it may become more susceptible to the fumigant.

Where the egg and post embryonic life stages of the pest are present and it is essential all pests are controlled it is advisable consider undertaking the fumigations in the warmer months or if necessary to introduce heat using appropriate heating systems. In addition longer exposure times would allow the more tolerant eggs to develop through to the more susceptible egg ages, possibly even into the very susceptible larval stage reducing the lethal dosage. If conditions are not suitable more than one fumigation may be needed to control the infestation after egg hatch.

Some pest species e.g. *Anobium punctatum*, produce only one generation per year and therefore presents an alternative strategy to avoid using the high rates necessary to achieve complete kill of the more tolerant eggs. These eggs may only represent a small percentage of the population. Fumigations could be done before or after the period when adult beetles are likely to be emerging and

Waiting period to protect man and animals

No one should be in the treated area if the concentration of sulfuryl of sulfuryl fluoride is above 3 ppm.

from the wood so the correct fumigation timing is selected.

- 5.5 Function (IIB5.5) Function to destroy wood destroying insects and nematodes
- 5.6 Pest organism(s) to be controlled and products, organisms or objects to be protected (IIB5.6)

5.6.1 Pest organism(s) to be controlledWith the exception of termites all life stages of listed pests are controlled. Since termites are social insects only the non-egg stages need to be killed to eliminate the colony from wood.

	Common Name(s)	Scientific Name
	Drywood termites	Cryptotermes cavifrons, Incisitermes minor, Incisitermes snyderi, Neotermes jouteli, Kalotermes approximates
	Formosan termites	Coptotermes formosanus
	Common furniture beetle, house borer, wood worm	Anobium punctatum
	Powder post beetle	Lyctus brunneus
	House longhorn beetle, European house borer, old house borer	Hylotrupes bajulus
	Pine wood nematode	Bursaphelenchus xylophilus
oducts, organisms objects to be	Disinfestation of wood from wood wooden structures/rooms (e.g. chu	destroying pests. Uses include rches, houses), wooden objects and

5.6.2 Products, organisms or objects to be protected Disinfestation of wood from wood destroying pests. Uses include wooden structures/rooms (e.g. churches, houses), wooden objects and timber in fumigation chambers, shipment containers and in stacks under tarpaulins.

Section B5 Annex Point IIB, V.		Intended uses and efficacy	
5.7	Effects on target organisms (IIB5.7)	Symptomology	
	g	Symptoms in exposed insects are lethargy in termites, whereas cockroaches become highly agitated and pest beetle larvae and adults emerge from hiding areas before death. Expulsion of body fluids may also occur. Mortality is generally rapid, occurring in minutes to hours at dosages significantly exceeding the lethal threshold, but may be delayed for several days, at marginally effective dosages (Osbrink, <i>et al</i> ¹ 1988). Long-term effects, such as reduction in fecundity, have not been reported for insects surviving to adult stage, but this possible effect has not been carefully examined.	
		¹ Osbrink, W.L.A., Scheffrahn, R.H., Hsu, R.C. and Su, N-Y. (1988). Sulfuryl fluoride residues of fumigated foods protected in polythene bags. Journal of Agriculture and Food Chemistry, 36 (4), 853 – 855.	
5.8	Mode of action (including time delay) in so far as not covered by section A5.4 (IIB5.8)	<u>Mode of entry into pest</u> Sulfuryl fluoride occupies the air spaces within the fumigated site. These air spaces may be visible e.g. cracks and crevices within structures or unseen e.g. air spaces within wood. Sulfuryl fluoride enters the post embryonic life stages of insects via their spiracles; entry into the egg stages is achieved via diffusion.	
		<u>Mode of action</u> Sulfuryl fluoride is a fumigant, which penetrates the pest's body through inhalation in actively respiring life stages (larvae, pupae and adults) or diffusion into the egg. Sulfuryl fluoride is considered a non-specific target poison acting by disrupting the glycolysis and citric acid cycles, thereby depriving the insect of the necessary energy for survival (Meikle <i>et al</i> ² 1963). Upon sulfuryl fluoride entering a target organism it is broken down to the insecticidally active fluoride anion which disrupts the glycolysis and fatty acid cycles, depriving the pest of the necessary cellular energy. Outram ³ (1967) suggests inhibition of magnesium enzyme systems is the inhibitory action within the glycolysis cycle. When the glycolysis and fatty acid cycles are inhibited, insects attempt to utilise protein and amino acids to maintain a viable energy level, but these alternative energy producing processes are insufficient to maintain a sufficient metabolic rate for survival. An increase in oxygen uptake in fumigated pest <i>vs</i> unfumigated pests occurs.	
		<u>Speed of action</u> The effectiveness of sulfuryl fluoride is dependent on the concentration at the site of the pest, the exposure time (concentration x time product) and the physiological response of the pest species and life stage. Temperature at the site of the pest also affects its metabolic activity and the speed of action of sulfuryl fluoride. The post embryonic life stages (larvae, pupae and adults) have faster metabolic processes compared to eggs (Kenaga ⁴ , 1957) which therefore require either a longer exposure or greater concentration. In a study on termite eggs Outram (1967) found that it took at least 24	

hours for sulfuryl fluoride to penetrate the shell. He suggested that

Section B5 Annex Point IIB, V.	Intended uses and efficacy
	this might be due to the impermeability of the egg shell, with sulfuryl fluoride being bound to its outer protein layer and the embryonic membranes.
	Due to mode of action of the fumigant mortality may be delayed for several days. Osbrink <i>et al</i> ⁵ (1987) reported a range of mean delayed mortality times post-fumigation for ten termite species of 1.58 days for <i>Incisitermes snyderi</i> to 3.11 days for <i>Reticulitermes tibialis</i> .
	² Meikle, R.W., Stewart, D., Globus, O.A. (1963). Drywood termite metabolism of Vikane fumigant as shown by labeled pool technique. Journal of Agriculture and Food Chemistry 11, 226 – 230.
	³ Outram, I. (1967). Factors affecting the resistance of insect eggs to sulphuryl fluoride-11. The distribution of sulphuryl ³⁵ S fluoride in insect eggs after fumigation. Journal of Stored Product Research, 33, $353 - 358$.
	⁴ Kenaga, E.E. (1957). Some biological, chemical and physical properties of sulfuryl fluoride as an insecticidal fumigant. Journal of Economic Entomology, 50, $1 - 6$.
	⁵ Osbrink, W.L.A., Scheffrahn, R.H., Su, N-Y., and Rust, M.K. (1987). Laboratory comparisons of sulfuryl fluoride toxicity and mean time mortality among ten termite species (Isoptera: Hodotermitidae, Kalotermitidae, Rhinotermitidae). Journal ofr Economic Entomology, 80, 1044 – 1047.
5.9 User: industrial, professional, general public (non-professional) (IIB5.9)	
1. Industrial	No industrial use
2. Professional	Sulfuryl fluoride is used by the professional user only (licensed / approved fumigator).
3. General public	Sulfuryl fluoride is not used by the general public.

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Section B5

Annex Point IIB, V.

5.10Efficacy data: The proposed label claims for the product and efficacy data to support these claims, including any available standard protocols used, laboratory tests, or field trials, where appropriate (IIB5.10)

The current Swedish label is attached below as an insert and as Appendix to this file.



Intended uses and efficacy

An OES (5 ppm) for sulfuryl fluoride had been established by numerous countries, including the UK, Sweden, Germany, the Netherlands and the US, and in all cases it is 5 ppm. For these reasons, Dow AgroSciences felt it was not appropriate to propose an AOEL, and were not at liberty to alter the established OES. During the data development for the 91/414/EEC data package numerous operator/bystander exposure studies were undertaken. Based on these studies and the fact that sulfuryl fluoride is now regulated under both Directives 91/414/EEC and 98/8/EC Dow AgroSciences felt it appropriate now to propose and AOEL which was set at 3 ppm. Therefore to ensure consistency Dow AgroSciences proposes to change current labels under 98/8/EC from the OES of 5 ppm to the AOEL of 3 ppm.

In the current labels in Swedish, Norwegian and Finnish the maximum concentration of 128 g/m^3 is not given. At 5°C the required concentration may exceed this level as the effectiveness of sulfuryl fluoride is reduced. For some insects at this temperature laboratory studies have shown mortality of target pest insects may not be achieved. By increasing the minimum temperature to 10° C will improve the effectiveness of sulfuryl fluoride and control can be achieved within the 128 g/m^3 maximum concentration level. It is proposed that for all sulfuryl fluoride labels the maximum concentration level is included.

The same pests may be widespread within the EU and in other countries or they may not be present but represent a potential threat and control measures need to be undertaken to prevent their introduction. Some are of such significance that international quarantine treatment standards for their control have been or are being adopted by countries around the world. The types of habitat where these pests occur, their food source and the environmental conditions i.e. temperature and relative humidity, which enable them to thrive are similar in the different countries. Therefore the data from field studies reported in the dossier from Europe and the USA are all considered as being relevant to support the application for EU authorisation of sulfuryl fluoride.

5.10.1 Proposed label claims for the product Control of existing infestation in wood of the following pests:

Common Name(s) Drywood termites Scientific Name

Cryptotermes cavifrons, Incisitermes minor, Incisitermes snyderi, Neotermes jouteli, Kalotermes approximates

Secti Anne	on B5 x Point IIB, V.	Intended uses and efficat	Cy	
		Formosan termites	Coptotermes formosanus	
		Common furniture beetle, house borer, wood worm	Anobium punctatum	
		Powder post beetle	Lyctus brunneus	
		House longhorn beetle, European house borer, old house borer	Hylotrupes bajulus	
		Pine wood nematode	Bursaphelenchus xylophilus	
		Areas of use include:		
		Fumigation of wooden structur of wooden objects/timber in fur stacks under tarpaulins.	es/rooms (e.g. churches, houses) and migation chambers, containers, and	
5.10.2	2 Efficacy data	See separate documents B5.10.	2.	
		The different terms: 'fumigatio 'exposure' all have the same m the target insect species is expo concentration may be constant may reduce over time. For the time the fumigated area would would be expected in a laborate concentration over time would e.g. as would be expected in a l minimise the loss of concentrate appropriate permanent or temp	n lasted for', 'exposure time', eaning. This being the time for which osed to sulfuryl fluoride. The exposure throughout the exposure time or it concentration to remain constant over need to be completely gas tight e.g. as ory fumigation chamber. Reduction in be expected in a non-gas tight area building. Efforts should be made to tion where gas loss is expected using orary sealing techniques.	
5.11	Any other known limitations on efficacy including resistance (IIB5.11)	In over 40 years of use, during for the control of termites and y not developed any known resis known evidence to cross-resistar resistant insects. Modeling has given the frequency of use and resistance risk is low. These fir destroying pests. Taking these resistance management strategis should be considered as part of management.	which sulfuryl fluoride has been used wood boring beetles, these insects have tance to the fumigant. There is also no ance to sulfuryl fluoride in phosphine also shown for stored product insects, the life cycles of these pests that the adings can be extrapolated to wood factors into consideration, no specific es are planned. However, fumigation an integrated approach to pest	Х
5.11.1	l Use-related restrictions	If fumigating for insect pests de site of pest activity is below 10 measured at the slab foundation part of the structure may be. For temperatures below 20°C.	o not apply when temperatures at the °C. This temperature may be n, sub-floor or wherever the coolest or pinewood nematode do not apply at	
5.11.2	2 Prevention of the development of resistance	To avoid the development of product Vikane should be appli- by the Fumiguide calculators. considered as part of an over	of resistance sulfuryl fluoride as the ied according at the dosage determined The use of the fumigant should be rall insect pest management plan and	

Section B5 Annex Point IIB, V.	Intended uses and efficacy	
	other methods of pest control such as effective cleaning and avoidance of re-infestation should be practised. Where possible insect trapping and site specific monitoring on a routine basis to ensure effective timing and targeting of the fumigation.	
	Reports of lack of performance will be fully investigated to determine the cause. If the cause cannot be readily established insects will be collected and tested for their sensitivity to sulfuryl fluoride.	
5.11.3 Concomitant use with other (biocidal) products	Sulfuryl fluoride is not mixed in cylinder with any other substance.	

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments on applicant's data	Field 5.10: The content of the product labels will be assessed at Member State level in connection to product authorisation.
	Field 5.11: A Sequential Quantitative Insecticide Resistance Model (SQUIRM) was used to evaluate the potential for sulfuryl fluoride resistance to develop in insect pests in stored products. The model was designed based on population dynamics by tracking the size and genetic mix of an insect population of many generations. The inputs include biological, genetic and operational factors. The modelling was conducted for two major stored product insect pests namely <i>T.castaneum</i> and <i>P.interpunctella</i> . The results showed that the probability of resistance development to sulfuryl fluoride is very low because of its unique mode of action, lack of cross-resistance risk analysis (Sequential Quantitative Resistance Model). Dow AgroSciences LLC, Zionsville Road, Indianapolis, Indiana, USA. Ref no. Z42).
Conclusion	Applicant's conclusions are adopted.
Acceptability	The information is considered acceptable.
Remarks	No remarks.

Table B5-1: Summary table of data	on the method of application	including description of system used
Tuble De 1. Summary tuble of dutu	on the method of application	menualing description of system used

Serial number	Product type	Substance(s) used for dilution	Concentration of dilutant(s)	Other substance(s) added	Application technique	Remarks
(1)	PT08.02	Sulfuryl fluoride CAS: 2699-79-8	≥998 g/kg	Vikane, the product, is the technical material 99.8 %w/w. There are no other formulants or constituents of formulants in the 'product' Vikane.	Fumigation	
(2)	PT18.01	Sulfuryl fluoride CAS: 2699-79-8	≥998 g/kg	Vikane, the product, is the technical material 99.8 %w/w. There are no other formulants or constituents of formulants in the 'product' Vikane.	Fumigation	To be notified in the 2 nd list

Table B5-2: Summary table of data on the number and timing of applications, and where relevant, any particular information relating to geographical variations, climatic variations, or necessary waiting periods to protect man and animals

Serial number	Product type	Application type	Number and timing of application	Waiting periods	Information on recommended variations of the application rate in different locations	Remarks
(1)	PT08.02	Fumigation of structures, chambers, containers and stacks under tarpaulin.	A single fumigation may achieve eradication of pest. A further application may be needed if conditions are not optimimal. No restriction on exposure time is required.	Concentration of sulfuryl fluoride should be ≤ 3 ppm before re- entry into a treated structure.	If fumigating for insect pests, do not apply when temperatures at the site of pest activity is below 10°C. This temperature may be measured at the slab foundation, sub-floor or wherever the coolest part of the structure may be. For pinewood nematode do not apply at temperatures below 20°C.	
(2)	PT18.01	Fumigation	To be notified in the 2 nd list	To be notified in the 2 nd list	To be notified in the 2 nd list	To be notified in the 2^{nd} list

Dow A RMS:	AgroSciences Sweden	April 2004 Vikane Doc	III-B5		
Sectio	on B5.10.2	Efficacy Data			
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/01 Termites Laboratory study (Ref. Z1)			
		1 REFERENCE: Z1, B5.10.2/01	Official use only		
1.1	Reference	Osbrink, W.L.A., Scheffrahn, R.H., Su, N-Y., and Rust, M. K. (1987).			
		Fort Lauderdale Research and Education Centre, University of Florida, Institute of Food and Agricultural Sciences, Fort Lauderdale, Florida 33314, USA.			
		Laboratory comparisons of sulfuryl fluoride toxicity and mean time of mortality among ten termite species (Isoptera: Hodotermitidae, Kalotermitidae, Rhinotermitidae).			
		Journal of Economic Entomology Volume 80, pages 1044-1047.			
1.2	Data protection	Not protected.			
1.2.1	Data owner	Data in the public domain in published paper.			
1.2.2	Companies with letter of Access	Not relevant.			
1.2.3	Criteria for data protection	No data protection claimed.			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice. The experimental design enabled robust statistical analysis to be undertaken to ensure high confidence in the data generated.			
1.4	Deviations	Not applicable as the study was not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride			
2.1.1	Trade name/ proposed trade name	Vikane			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a gas chromatograph.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				

Dow A	AgroSciences Sweden	April 2004VikaneDoc I	III-B5
Sectio	on B5.10.2	Efficacy Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/01 Termites Laboratory study (Ref. Z1)	
2.3.1	Test population / inoculum / test organism	See Table 1.1.	Х
2.3.2	Test system	See Table 1.2.	
2.3.3	Application of test substance	See Table 1.3.	
2.3.4	Test conditions	See Table 1.4.	
2.3.5	Exposure time	22 hours.	
2.3.6	Number of replicates performed	Each dosage was replicated three times except in tests with <i>K</i> . <i>approximatus</i> , which were replicated twice, and the soldier and alate castes, which were not replicated because of their limited availability.	
2.3.7	Controls	Controls were included; these were tested concurrently in a Pyrex desiccator (fumitorium).	
2.4	Examination		
2.4.1	Effect investigated	Lethal accumulated dosage (LAD) expressed as $g-h/m^3$. Two effects were determined - LAD_{50} i.e., lethal accumulated dosage to achieve 50% mortality and LAD_{99} lethal accumulated dosage to achieve 99% mortality.	
2.4.2	Method for recording	Termite mortality.	
2.4.3	Intervals of examination	Mortality was tallied upon termination of the fumigation and every 24 hours for five days.	
2.4.4	Statistics	Data obtained from the studies on termite larvae were analysed by probit procedure (Reference: SAS Institute 1985. SAS user's guide to statistics, version 5, SAS Institute, Cary, N.C.) Control mortality did not exceed 5% and was ignored (Reference: Finney, D. J. 1971. Probit analysis, Cambridge University, London). Post fumigation mean total mortality was calculated by dividing the number of dead termites of a particular species occurring on a given day by the total mortality 5 days post fumigation, multiplying this value by the respective day and summing days 0-5 to produce a weighted average mortality (Reference; Moar, W. J. and Trumble, J. T.1987 Toxicity, joint action and mean time of mortality of Dipel 2X, average meetin B ₁ neem and thuringiensis against beet army worm (Lepidoptera: Noctuidae). Journal of Economic Entomology 80, 588-592). Mean time mortality (MTM) was calculated for all gas concentrations for each species. Analysis of variance (ANOVA) was used to test for differences of MTM between gas concentrations within species (P = 0.05). When a significant difference of MTM between gas concentration was found within a given species, the relationship between MTM and gas concentration was analysed by linear regression of MTM, the dependent variable, on gas concentration, the independent variable. The grand MTM was obtained by each species by averaging the MTM's for all gas concentrations. ANOVA was followed by mean separation using Student-Newman- Keuls test (P = 0.05) values between species.	Χ

Dow RMS	AgroSciences : Sweden	April 2004	Vił	kane	Doc 1	III-B5
Section	on B5.10.2	Efficacy Data	L			
Annex TNsG Pt. III	x Point IIB5.10 : Pt. I-B5.10, -Ch. 6	B5.10.2/01 Te Laboratory st	ermites tudy (Ref. Z	1)		
2.4.5	Post fumigation monitoring of termites	The total mortalit determined five c	ty effect of sulfu lays after fumig	aryl fluoride on term ation.	ites was	
		3 RESUL	TS			
3.1	Efficacy	The lethal accum against larvae of below. <i>Reticulite</i> least sensitive to 80 and 100% mon <i>N. jouteli</i> and <i>Z. a</i> <i>jouteli</i> and <i>P. sim</i> respectively.	ulated dosages 10 termite speci ermes spp. were sulfuryl fluoride rtality at 22.0 ar angusticollis all uplex demonstra	(LAD g-h/m ³) of sulfies for 22 hour exposite the most sensitive and e. Alates of <i>K. approbabelies</i> Alates of <i>K. approbabelies</i> died at 26.4 g-h/m ³ . ted 40 and 100% mo	furyl fluoride ure is tabulated ad <i>I. Minor</i> the <i>oximatus</i> displayed ctively. Alates of Soldiers of <i>N</i> . rtality at 22 g-h/m ³	х
		Termite life stag	ge: Larvae			х
		Species	LAD ₅₀	LAD ₉₉	95% FL	
		R. flavipes	13.42a	-	13.20-13.86	
			-	20.02a	19.14-21.34	
		R. tibialis	14.52	-	14.08-15.18	
			-	30.36b	27.28-35.20	
		N. jouteli	20.02	-	17.82-21.34	
			-	36.08bcd	32.78-42.90	
		K. approximatus	22.89	-	20.59-24.19	
			-	44.29cde	37.63-65.10	
		C. cavifrons	23.76d	-	22.88-24.42	
			-	36.96bc	34.76-40.26	
		P. simplex	24.42d	-	23.32-25.08	
			-	41.60cde	30.06-48.62	
		C. formosanus	26.40e	-	25.96-27.06	
			-	39.16cd	37.18-42.46	
		I. snyderi	27.28e	-	26.62-28.16	
			-	46.42de	41.58-55.22	
		Z. angusticolis	28.38e	-	28.16-28.82	
			-	34.98b	33.88-36.30	
		I. minor	30.36f	-	29.48-31.68	
			-	51.04e	44.66-66.22	

Means within a column followed by the same letter indicate overlap of

Dow A RMS	AgroSciences : Sweden	April 2004 Vikane	Doc III-B5			
Sectio	on B5.10.2	Efficacy Data				
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/01 Termites Laboratory study (Ref. Z1)				
		95% fiducial limits				
		Greatest and least post fumigation grand mean time of mortality (SEM) was 3.11 ± 0.04 and 1.58 ± 0.05 days for <i>R. tibialis</i> and <i>I s</i> respectively.	(± nyderi,			
		Regressions of probit-mortality (g-h/m ³) on log-dosage of termite species indicate differences in probit regression slopes between s with <i>Z. angusticollis</i> possessing a uniquely steep slope.	pecies,			
3.1.1	Dose/Efficacy curve	Not available from report.				
3.1.2	Begin and duration of effects	Five days were required after fumigation to obtain the total morta effect of sulfuryl fluoride on termites.	ılity			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.				
3.2	Effects against organisms or objects to be protected	None reported.				
3.3	Other effects	None reported.				
3.4	Efficacy of the reference substance	No reference substance was used.				
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.				
3.6	Efficacy limiting factors					
3.6.1	Occurrences of resistances	None reported.				
3.6.2	Other limiting factors	None reported.				
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS)			
4.1	Reasons for	1. Range of termites could be tested.				
	laboratory testing	2. Different dosages could be tested.				
		3. Practical, accurate procedure.				
		Data generated is considered relevant for field of use. Test insect obtained from the field.	ts			
4.2	Intended actual scale of biocide	Not applicable.				

Dow A	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III	Point IIB5.10 Pt. I-B5.10, ·Ch. 6	B5.10.2/01 Term Laboratory stud	ites y (Ref. Z1)	
	application			
4.3	Relevance compared to field conditions			
4.3.1	Application method	The principle of fumi sufficient period of ti target pest. There are to achieve this althou	gation is to confine a sufficier me to enable a toxic dose to be a number of ways in laborato gh the principle is the same.	nt concentration for a e received by the ory and field studies
4.3.2	Test organism	There are many diffe proven pests where c destroyed.	rent pest species of termites, the ontrol would be required to av	he species tested are roid wood being
4.3.3	Observed effect	The high mortality ef considered as the des	fects, LAD ₉₉ recorded in the la ired field response for the erac	aboratory test is lication of termites.
4.4	Relevance for read-across	The results on the ter considered relevant to	termite species representing to other species ground and sub	three families are oterranean termites.
		5 APPLICAN	T'S SUMMARY AND CON	ICLUSION
5.1	Materials and methods	Ten termite species, 2 cavifrons, Incisterme Kalotermes approxim tibialis, Reticuliterme with sulfuryl fluoride insects were collected exposed to sulfuryl fl Untreated termites w was measured using a tallied every 24 hours	Zootermopsis angusticollis, Cr s minor, Incisitermes snyderi, natus, Coptotermes formosanu es flavipes, Prorhinotermes sin for 22 h at 27°C in laboratory d from naturally infested wood uoride to establish the LAD ₅₀ ere included in the test. Fumig a gas chromatograph. Mortality s for five days.	<i>Typtotermes</i> <i>Neotermes jouteli</i> , <i>ss, Reticulitermes</i> <i>nplex</i> ,were fumigated <i>r</i> fumitoria. The test d. The termites were and LAD ₉₉ values. gant concentration ty was assessed and
5.2	Reliability	Reliability indicator 2 accepted scientific pr methodological defic results.	2: Study conducted in accordation inciples, possibly with incomplete incies, which do not affect the	nce with generally blete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	Five days were requireffect of sulfuryl fluc (LAD – lethal accums sensitive species and of <i>K. approximatus</i> of h/m ³ respectively as of 44.29 g-h/m ³ Alates h/m ³ whereas 99% m 34.98 g-h/m ³ respect sensitive to sulfuryl f fumigation at dosage Soldiers of <i>N. jouteli</i> mortality at 22 g-h/m pseudergates to sulfur	red after fumigation to obtain to oride on termites. Based on LA ulated dosage) <i>Reticulitermes</i> <i>I. Minor</i> the least sensitive to isplayed 80 and 100% mortali compared with 99% mortality of <i>N. jouteli</i> and <i>Z. angusticol</i> ortality of pseudergates occurr ively. Alates seem, in these in luoride than pseudergates. This is that successfully control pseu and <i>P. simplex</i> demonstrated ³ respectively. Therefore, sen ryl fluoride (LAD ₅₀ = 20.02 g- rs, but <i>P. simplex</i> pseudergates	the total mortality AD ₅₀ and LAD ₉₉ spp. were the most the fumigant. Alates ty at 22.0 and 24.2 g- of pseudergates at <i>llis</i> all died at 26.4 g- red at 36.08 and istances to be more nus swarming after a udergates is unlikely. 40 and 100% sitivity of <i>N. jouteli</i> -h/m ³) corresponded s were much less

Dow RMS	AgroSciences S: Sweden	April 2004	Vikane	Doc III-B5
Secti	on B5.10.2	Efficacy Data		
Annez TNsG Pt. III	x Point IIB5.10 : Pt. I-B5.10, [-Ch. 6	B5.10.2/01 Ter Laboratory stu	mites 1dy (Ref. Z1)	
		sensitive (LAD ₅₀ = differential sensitiv important as the w without pseuderga	41.80 g-h/m ³) than their soldiers vity of soldiers relative to pueude ith the alate caste because the for tes.	s. Implications of ergates are not as rmer cannot survive
		Grand mean time r species (F = 38.86 <i>formosanus</i> remain <i>snyderi</i> , the quicked days. As sulfury r that inhibit the acti resulting in cessati maintain life proce protein catabolism observed delayed r	nortality's were significantly diff. df = 9,145; P = 0.0001). R. trbi- ned alive for an average of > five est to succumb, remained alive ar fluoride is metabolised, fluoride a vity of enzymes containing a ma on of lipid catabolism and glycol esses must be alternately derived . Energy flow becomes negative nortality.	ferent between <i>alis</i> and <i>C</i> . days, whereas <i>I</i> . a verage of > 1.5 anions are produced gnesium co-factor lysis. Energy to from amino acid and p, resulting in the
5.4	Conclusion	Worldwide there a into six families. on the basis of their tests undertaken w for evaluating the results showed tha of termites. Being killed. Since the in comparatively low embryonic life stag	re approximately 1,800 species of The termite species included in the ir economic importance. The lab ere considered to be a valid and de efficacy of sulfuryl fluoride on te t sulfuryl fluoride was highly effi- social insects only the non egg l nsect egg stage is known to be less er dosages can be used for the m ges.	of termites divided ne tests were selected loratory fumigation effective procedure ermites. The efficacy fective on all species if stages must be ss susceptible ore susceptible post
5.5	Proposed efficacy	Termites		
	specification	Total control – era	dication from wood material	
			-	
		Evaluation by	Competent Authorities	

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 2.3.1: In Table 1.1 Test organisms, the following corrections are suggested:
	Life stage (Hodotermitidae): Larvae/pseudergates and alates.
	Life stage (Kalotermitidae): Larvae/pseudergates of all species, soldier termites of <i>N. jouteli</i> and alates of <i>K. approximates</i> and <i>N. jouteli</i> .
	Life stage (Rhinotermitidae): Larvae/pseudergates of all species and soldier termites of <i>P. simplex</i>
	Field 2.4.4 first line/Field 3.1 second line and table heading: In reference study the termite larvae are denoted pseudergates.
	Pseudergates carry out the function exercised by workers in the higher termites (IMMS' General Textbook of Entomology. 10 th edition, Vol. 2. Richards, O. W. and Davies, R. G. Chapman and Hall, London).
Summary and conclusion	Applicant's summary and conclusion is adopted.

1.1 Test organisms - Termites

Criteria	Details
Family	Hodotermitidae.
Species	Zootermopsis angusticollis.
Source	Collected from naturally infested wood, stored in containers < 2 weeks before testing.
Life stage	Larvae, alates.
Mixed age population	Undifferentiated larvae of at least third or first-molt nymphs.
Number of termites in test	Thirty per treatment.

Criteria	Details
Family	Kalotermitidae (drywood termites).
Species	Cryptotermes cavifrons, Incisitermes minor, Incisitermes snyderi, Neotermes jouteli, Kalotermes approximatus.
Source	Collected from naturally infested wood, stored in containers < 2 weeks before testing.
Life stage	Larvae of all species, soldier termites of <i>N. jouteli</i> , <i>P. simplex</i> and alates of <i>N. jouteli</i> .
Mixed age population	Undifferentiated larvae of at least third or first-molt nymphs.
Number of termites in test	Thirty per treatment.

Criteria	Details
Family	Rhinotermitidae.
Species	Coptotermes formosanus, Reticulitermes tibialis, Reticulitermes flavipes, Prorhinotermes simplex.
Source	Collected from naturally infested wood, stored in containers < 2 weeks before testing.
Life stage	Larvae.
Mixed age population	Undifferentiated larvae of at least third or first-molt nymphs.
Number of termites in test	Thirty per treatment.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) consisted of Pyrex desiccators, 250 mm internal diameter of ca. 9 litres in volume. The lid opening of each desiccator was plugged with a one-hole neoprene stopper. The male end of a tube adapter of 6 mm external diameter was inserted through the stopper's hole. A nut

	compressed a neoprene septum against the fitting end of the tube adapter, allowing gas introduction or removal while maintaining a closed lid. Lids were sealed to desiccator bodies with silicone vacuum grease.
Number of chambers	For termite larvae six fumatoria were used for all termite species except for <i>I. Minor</i> , <i>N. jouteli</i> , <i>Z. angusticollis</i> and <i>K. approximatus</i> which were placed in five fumatoria. For other termite life stages a single fumitorium was used.
Test insects introduction into chamber	Thirty termites of each species were into each fumitorium as two subsamples of 15 termites and held in vented glass Petri dishes of 500 mm internal diameter.
Measuring equipment	Gas concentrations were verified upon initiation and termination each test by injecting a gas sample of fumitorium atmosphere into a gas chromatograph equipped with a glass column measuring 2.44 m by 2 mm internal diameter packed with Chromosorb 101.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the fumitoria in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by a transfer of gas from a commercial dip tube cylinder to a stainless steel tubeless cylinder of 500 ml capacity. Gas delivery pressure from the tubeless cylinder was reduced from ca. 18 kg/cm ² to ca. 2.8 kg/cm ² with a regulator. The regulated gas was passed through a polyethylene gas sample tube of 270 ml modified with a rubber septum. Exact amounts of neat sulfuryl fluoride were transferred from the gas sample tube to the fumatorium with a gas syringe. Gas was mixed as it was injected into the fumatorium and afterwards for 5 min using a propeller attached to a magnetic stir disk driven by a stir plate.
Dosage rate	Larvae
	All species were fumigated at 0.1 g/m ³ increments at concentrations ranging from 1.0 to 1.5 g/m ³ except for <i>R. flavipes</i> and <i>R. tibialis</i> which received dosages ranging from 0.4 to 0.9 g/m ³ . All fumigations lasted for 22 hours.
	Soldier termites
	N. jouteli and P. simplex
	Termites exposed to accumulated dosage of 22 g- h/m^3 .
	Alates
	K. approximatus

Dow AgroSciences April 2004 RMS: Sweden

Vikane

Termites exposed to accumulated dosage of 22 and 24 $g-h/m^3$.
N. jouteli
Termites exposed to an accumulated dosage of 26.4 g-h/ m^3
Z. angusticollis
Termites exposed to an accumulated dosage of 30.8 g-h/m^3 .

1.4 Test conditions

Criteria	Details	
Substrate	The Petri dishes which contained termites for introducing into the fumitoria were supplied. with filter paper for mechanical support. Filter paper was moistened for <i>R. flavipes</i> , <i>R. tibialis</i> , <i>C. formosanus</i> , <i>P. simplex</i> and <i>N. jouteli</i> to prevent desiccation.	
Incubation temperature	All fumigations were conducted at 27°C.	
Moisture	Initial atmosphere within the fumitoria was at ca. 80% relative humidity.	

Section B5.10.2 Efficacy Data			
Annex TNsG: Pt. III	Point IIB5.10 Pt. I-B5.10, -Ch. 6	B5.10.2/02 Termites Laboratory study (Ref. Z2)	
			Official
		1 REFERENCE: Z2, B5.10.2/02	use only
1.1	Reference	Su, N-Y., Osbrink, W.L.A., and Scheffrahn, R. H. (1989).	
		Fort Lauderdale Research and Education Centre, University of Florida, Institute of Food and Agricultural Sciences, Fort Lauderdale, Florida 33314, USA.	
		Concentration-time relationship for fumigant efficacy of sulfuryl fluoride against the Formosan subterranean termite (Isoptera: Rhinotermitidae)	
		Journal of Economic Entomology Volume 82, pages 156-158.	
1.2	Data protection	Not protected.	
1.2.1	Data owner	Data in the public domain in published paper.	
1.2.2	Companies with letter of Access	Not relevant.	
1.2.3	Criteria for data protection	No data protection claimed.	
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice. The experimental design enabled robust statistical analysis to be undertaken to ensure high confidence in the data generated.	
1.4	Deviations	Not applicable as the study was not conducted to an international standard method.	
		2 METHOD	
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.	
2.1.1	Trade name/ proposed trade name	Vikane.	
2.1.2	Composition of Product tested	>99% Sulfuryl fluoride.	
2.1.3	Physical state and nature	Fumigant.	
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a gas chromatograph.	
2.1.5	Method of analysis	Not applicable.	
2.2	Reference substance	No reference substance was included in the study.	
2.2.1	Method of analysis for reference substance	Not applicable.	

Dow A RMS:	AgroSciences Sweden	April 2004 Vikane Doc	III-B5
Sectio	on B5.10.2	Efficacy Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/02 Termites Laboratory study (Ref. Z2)	
2.3	Testing procedure		
2.3.1	Test population / inoculum / test organism	See Table 1.1.	
2.3.2	Test system	See Table 1.2.	
2.3.3	Application of test substance	See Table 1.3.	
2.3.4	Test conditions	See Table 1.4.	
2.3.5	Exposure time	22 hours.	Х
2.3.6	Number of replicates performed	Each treatment was replicated three times.	
2.3.7	Controls	Controls were included, these were tested concurrently in a Pyrex desiccator (fumitorium).	
2.4	Examination		
2.4.1	Effect investigated	The study was undertaken to primarily undertaken to establish if the product of the two parameters, time and concentration have an equal weighting in accumulation of dosage for the test termite species.	
		$C^n \ge t = k$	
		Where $C = \text{concentration}$, $t = \text{time}$, $n = \text{toxicity}$ index and $k = \text{dosage}$ fo a specific mortality level. If concentration and time have the same weighing then n will be equal to 1.	r
		The study also enabled a dose response to be established.	
2.4.2	Method for recording	Termite mortality.	
2.4.3	Intervals of examination	Termite survival counts after exposure to sulfuryl fluoride were made daily up to daily up to seven days. Dead or moribund termites were removed from the units in the fumitoria.	
2.4.4	Statistics	Worker mortality was corrected by a control mortality formula (Reference: Abbott, W.S. (1925). A method for computing the effectiveness of an insecticide. Journal of Economic Entomology, 18, 265-267) and square root transformed before analysis. For each accumulated dosage, mortalities corresponding to the exposure times were subjected to analysis of variance for the completely randomised block design (Reference: SAS Institute 1985. SAS user's guide to statistics, version 5, SAS Institute, Cary, N.C.). Colony origin was used as the block factor. Significant differences among exposure times were separated using the Student-Newman-Keuls test ($P = 0.05$). Lethal dosages for mortality levels of 50, 90 and 99% were estimated for each of the 12 exposure times using probit analysis. The LD ₅₀ , LD ₉₀ or LD ₉₉ values were then independently regressed against the exposure time on a logarithmic scale to estimate the toxicity index (n) as described by Winks (Reference: Winks, R.G. (1984). The toxicity of phosphine to	a

Sectio	n B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/02 Termites Laboratory study (Ref. Z2)		
		adults of Tribolium castaneum: time as a dosage factor.		
2.4.5	Post fumigation monitoring of termites	Termite survival counts after exposure to sulfuryl fluoride were made daily up to daily up to seven days.		
		3 RESULTS		
3.1	Efficacy	No differences in mortality of <i>C. formosanus</i> workers were found among the 12 exposure times when accumulated dosage was ≤ 20 g- h/m ³ (data tabulated below). At an accumulated dosage of 30 g-h/m ³ , significantly fewer termites died when exposure time was < 3 hours. Effects of exposure time became insignificant when accumulated dosage and corresponding mortality increase above before-mentioned levels. Time threshold (significant difference in concentration x time mortality) was 2 hours when accumulated dosage was 40 g-h/m ³ , while at accumulated dosages > 50 g-h/m ³ only those termites confined to sulfuryl fluoride for 1 hour responded with significantly lower mortality.		
		Linear regression lines of concentration (g/m^3) against exposure time for three mortality levels, 50, 90, 99%, were: LD_{50} : log C = -1.0706 log t + 1.6026 (R ² = 0.9927; P = < 0.0001); LD ₉₀ : log C = -1.0727 log t + 1.7280 (R ² = 0.9943; P< 0.0001); LD ₉₉ ; lod C = -1.0724 log t + 1.8066 (R ² = 0.9949; p < 0.0001). The toxicity index was approximately 0.93.		

Exposure (h)	Accumulated dosage (g-h/m ³)		
	10	20	30
1	$1.1 \pm 0.8a$	$0.7 \pm 0.5a$	$1.5 \pm 0.8a$
2	$5.5 \pm 2.1a$	$3.3 \pm 1.4a$	$2.4 \pm 1.7a$
3	$2.8 \pm 1.5a$	$4.4\pm2.9a$	$19.6 \pm 4.3b$
4	$1.5 \pm 0.7a$	$1.8 \pm 0.8a$	$58.8 \pm 5.7c$
6	$2.7 \pm 0.9a$	$6.8 \pm 5.8a$	$31.6 \pm 9.8bc$
8	$2.2 \pm 0.8a$	$4.6 \pm 1.4a$	41.3 ± 9.4 bc
10	$1.1 \pm 0.6a$	$6.3 \pm 2.7a$	$57.6 \pm 4.6c$
12	$2.2 \pm 1.0a$	$6.7 \pm 3.9a$	$55.4 \pm 12.4c$
24	$2.9 \pm 1.2a$	$1.9 \pm 1.0a$	$35.2 \pm 4.2 bc$
48	$0.8 \pm 0.5a$	$5.1 \pm 3.3a$	$34.9 \pm 4.4bc$
72	$1.9 \pm 0.8a$	$3.7 \pm 1.4a$	33.4 ± 8.3 bc
96	1.9 ± 0.9	$0.4 \pm 0.4a$	34.3 ± 6.9 bc

Mortality (% \pm SE) of *C. formosanus* exposed to sulfuryl fluoride

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2	Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/02 Ter Laboratory stu	mites 1dy (Ref. Z2)	

Exposure (h)	Accumulated dosage (g-h/m ³)		
	40	50	60
1	$3.0 \pm 2.6a$	$46.9\pm8.4a$	$80.8 \pm 7.2a$
2	$5.3 \pm 0.7 b$	$96.5\pm1.5b$	100b
3	$78.3 \pm 3.3c$	$92.3\pm2.5b$	$95.9 \pm 1.9 b$
4	$92.0 \pm 2.9c$	$99.2\pm0.5b$	$99.6\pm0.4b$
6	$91.0 \pm 2.3c$	$98.9\pm0.8b$	100b
8	$89.3 \pm 3.3a$	100b	100b
10	$87.2 \pm 2.8a$	$97.4 \pm 1.1b$	$99.6\pm0.4b$
12	$81.1 \pm 5.5c$	$97.0 \pm 1.2b$	$98.1\pm0.8b$
24	$90.7 \pm 2.6c$	$97.4\pm0.9b$	$99.6\pm0.4b$
48	$77.7 \pm 6.1c$	$99.6\pm0.4b$	100b
72	$88.3 \pm 3.4c$	$98.9\pm0.6b$	$98.3\pm0.9b$
96	$95.3 \pm 1.8c$	100b	100b

Data are means of nine replicates. Within a column, means followed by the same letter are not significantly different (P = 0.05; Student-Newman-Keuls test).

3.1.1	Dose/Efficacy curve	See 3.1.
3.1.2	Begin and duration of effects	Up to seven days were given after fumigation to obtain the total mortality effect of sulfuryl fluoride on termites.
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.
3.2	Effects against organisms or objects to be protected	None reported.
3.3	Other effects	None reported.
3.4	Efficacy of the reference substance	No reference substance was used.
3.5	Tabular and/or graphical presentation of the summarised	See 3.1.

Dow AgroSciences RMS: Sweden		April 2004 Vikane	Doc III-B5		
Section B5.10.2		Efficacy Data			
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/02 Termites Laboratory study (Ref. Z2)			
	results				
3.6	Efficacy limiting factors	Exposure time threshold for sulfuryl fluoride is < 1 hour.			
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS	,		
4.1	Reasons for laboratory testing	1. Termites from three different naturally occurring colonies could tested.	d be		
		2. A wide range dosages could be tested to determine the concentration relationship of sulfuryl fluoride on termite mortality.	ration-		
		3. Dosage response could be established.			
		4. Practical, accurate procedure			
		Data generated is considered relevant for field of use. Test insects obtained from the field.	S		
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration sufficient period of time to enable a toxic dose to be received by t target pest. There are a number of ways in laboratory and field stu- to achieve this although the principle is the same.	n for a he udies		
4.3.2	Test organism	The test insect, <i>C. formosanus</i> , is considered a test of economic importance and therefore a desirable species for the laboratory test	t.		
4.3.3	Observed effect	The desired result through fumigation of termites with sulfuryl flu is to achieve 100% control, i.e. eradication. Some of the dosages in the study achieved this result. These results were under laborat conditions and other factors occurring in the field need to be taken account when establishing the correct dosage. These include, as w the insect species, the gas tightness of the fumigated zone and the temperature at the site of the pest.	toride tested ory n into vell as		
4.4	Relevance for read-across	The results <i>C. formaoanus</i> is considered relevant to other species subterranean termites.	of		
		5 APPLICANT'S SUMMARY AND CONCLUSION			
5.1	Materials and methods	The subterranean termite species, <i>Coptotermes formosanus</i> , was exposed to sulfuryl fluoride over a range of six accumulated dosag -60 g-h/m^3) which included 12 exposure times (1-96 hours) to	ges (10		

Dow AgroSciences RMS: Sweden		April 2004 Vikane	Doc III-B5
Section B5.10.2		Efficacy Data	
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/02 Termites Laboratory study (Ref. Z2)	
		determine the concentration-time relationship on termite mortality addition dose responses were established. The test was conducted 27°C. in laboratory fumitoria. The test insects were collected from naturally infested wood from three different colonies. Untreated termites were included in the test. Fumigant concentration was measured using a gas chromatograph. Mortality was assessed aft seven days.	y. In d at m er
5.2	Reliability	Reliability indicator 2: Study conducted in accordance with general accepted scientific principles, possibly with incomplete reporting methodological deficiencies, which do not affect the quality of reresults.	rally or levant
5.3	Assessment of efficacy, data analysis and interpretation	Mortality assessment was established seven days after fumigation slopes of these regressions demonstrated parallelism. Despite the inclusion of data from the 1 hour exposure that showed significan lower mortality, no systematic deviation from the general model was found in the regressions. From the regression analysis the to index n was determined as 0.93 regardless of mortality levels. The results demonstrated that $C^{0.93} t = k$ is a satisfactory model to descent the response relationship for sulfuryl fluoride against <i>C. formosan</i> workers.	h. The http: $C^n t = k$ xicity he pribe hus
5.4	Conclusion	In commercial applications of sulfuryl fluoride it is considered th exposure time is equally important to concentration or the toxicit $n = 1$. The study showed that to achieve a level of control of <i>C</i> . <i>formosanus</i> workers of >95% a dosage, i.e., Ct (concentration x t 60 g-h/m ³ is required.	at y index ime) of
5.5	Proposed efficacy specification	Termites Total control – eradication from wood material.	

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 2.3.5 Exposure: The termites were exposed to sulfuryl fluoride for 1, 2, 3, 4, 6, 8, 10, 12, 24, 48, 72 and 96 hours (not only for 22 h).
Summary and conclusion	Applicant's summary and conclusion is adopted.

1.1 Test organisms - Termites

Criteria	Details	
Family	Rhinotermitidae.	
Species	<i>Coptotermes formosanus</i> (Common name: Formosan Subterranean Termite).	
Source	Three field colonies were collected from naturally infested wood, stored in containers < 2 weeks before testing.	
Life stage	Workers and soldiers.	
Mixed age population	Age not differentiated.	
Number of termites in test	Workers: thirty per treatment. Soldiers: three per treatment.	

1.2 Test system

Criteria	Details
Test chamber	Funitoria (funigation chambers) consisted of Pyrex desiccators, 250 mm internal diameter of ca. 9 litres in volume. The lid opening of each desiccator was plugged with a one-hole neoprene stopper. The male end of a tube adapter of 6 mm external diameter was inserted through the stopper's hole. A nut compressed a neoprene septum against the fitting end of the tube adapter, allowing gas introduction or removal while maintaining a closed lid. Lids were sealed to desiccator bodies with silicone vacuum grease.
Number of chambers	Seven fumitoria, six receiving a prescribed dosage and one control, were used.
Test insects introduction into chamber	Thirty workers and three soldiers were placed into glass Petri dishes of 500 mm internal diameter provisioned with a moistened filter paper. Three units were prepared for each of the three colonies and placed in a fumitorium.
Measuring equipment	Gas concentrations were verified upon initiation and termination each test by injecting a gas sample of fumitorium atmosphere into a gas chromatograph equipped with a glass column measuring 2.44 m by 2 mm internal diameter packed with Chromosorb 101.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the fumitoria in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by a transfer of gas from a commercial dip tube cylinder to a stainless steel tubeless cylinder of 500 ml capacity. Gas delivery pressure from the tubeless cylinder was reduced from ca. 18 kg/cm ² to ca. 2.8 kg/cm ² with a regulator. The regulated gas was passed through a polyethylene gas sample tube of 270 ml modified with a rubber septum. Exact amounts of neat sulfuryl fluoride were transferred from the gas sample tube to the fumatorium with a gas syringe. Gas was mixed as it was injected into the fumatorium and afterwards for 5 min using a propeller attached to a magnetic stir disk driven by a stir plate.
Dosage rate	The termites were exposed to sulfuryl fluoride for 1, 2, 3, 4, 6, 8, 10, 12, 24, 48, 72 and 96 hours. Different quantities of sulfuryl fluoride were introduced for each exposure time to yield accumulated dosages of 10, 20, 30, 40, 50 and 60 g- h/m^3 .

1.4 Test conditions

Criteria	Details
Substrate	The Petri dishes which contained termites for introducing into the fumitoria were supplied. with filter paper for mechanical support and to prevent desiccation.
Incubation temperature	All fumigations were conducted at 27°C.
Moisture	Initial atmosphere within the fumitoria was at ca. 80% relative humidity.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/03 Termites Simulated field study (Ref. Z3)			
			Official		
		1 REFERENCE: Z3, B5.10.2/03	use only		
1.1	Reference	Su, N-Y., and Scheffrahn, R. H. (1986).			
		Fort Lauderdale Research and Education Centre, University of Florida, Institute of Food and Agricultural Sciences, Fort Lauderdale, Florida 33314, USA.			
		Field comparison of sulfuryl fluoride susceptibility among three termite species (Isoptera: Kalotermitidae, Rhinotermitidae) during structural fumigation.			
		Journal of Economic Entomology Volume 79, pages 903-908.			
1.2	Data protection	Not protected.			
1.2.1	Data owner	Data in the public domain in published paper.			
1.2.2	Companies with letter of access	Not relevant.			
1.2.3	Criteria for data protection	No data protection claimed.			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice. The experimental design enabled robust statistical analysis to be undertaken to ensure high confidence in the in the data generated.			
1.4	Deviations	Not applicable as the study was not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope (thermal conductivity meter).			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Section B5.10.2		Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/03 Tern Simulated field	nites study (Ref. Z3)	
2.3.1	Test population / inoculum / test organism	See Table 1.1.		
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of test substance	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Exposure time	2 – 20 hours.		
2.3.6	Number of replicates performed	Each treatment was	replicated three times.	
2.3.7	Controls	Controls were include nearby to the fumigation	ded; these were placed in an untreater ation chambers.	ed building
2.4	Examination			
2.4.1	Effect investigated	The study was under fluoride on termites	rtaken to determine the effectiveness under field conditions.	s of sulfuryl
2.4.2	Method for recording	Termite mortality.		
2.4.3	Intervals of examination	After each designate recorded immediate and removed from e freshly provisioned tallied after the 20 h 30°C incubation cha which were stopped	ed exposure period initial termite mo ly. Dead and moribund individuals ach container and survivors were tra Petri dishes. Mortality in the contro our count. All surviving termites w mber for succeeding 24 hours post t after no additional mortality was ob	ortality was were counted unsferred to 1 group was ere stored in a reatment counts oserved.
2.4.4	Statistics	Since the control un mortality was extrap formula (Reference: effectiveness of an i 265-267) was used t used for each 2 hour container type as the variable. Mortality square root values a Significant difference = 0.05).	its were only examined at 20 hours a polated for each of the 2 hour counts Abbott, W.S. (1925). A method for nsecticide. Journal of Economic Ent to correct control mortality. The stat r series was a 3 x 2 factorial, with sp e main effect and termite mortality a percentages were transformed to the nd were subjected to analysis of vari- ces were detected by Student-Newm	a linear control . Abbots r computing the omology, 18, tistical design ecies and s the response arcsine of their fance. an-Kuels test (P
2.4.5	Post fumigation monitoring of termites	See 2.4.3.		
		3 RESULTS		
3.1	Efficacy	Seventy-two hours we to fully express its le <i>formosanus</i> in Petri species when elapse	was required after the exposure to su ethal effect on the termites. Initial n dishes were significantly lower than d exposure time was $10 - 12$ hours a	lfuryl fluoride nortalities of C. the other at 3 g/m ³ and 8

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2	Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/03 Terr Simulated field	nites study (Ref. Z3)	

hours at 6 g/m³. However, the 72 hour mortality showed no significant differences among species in the Petri dishes. In the wooden enclosures, initial mortalities for *C. formosanus* were also significantly lower than the drywood termites for 10 - 20 hours at 3 g/m³, 8 - 18 hours at 6 g/m³ and 4 - 12 hours at 12 g/m³. In contrast to the results in the Petri dishes mortality in the wood enclosures was also significantly lower for *C. formosanus* after 8 - 10 and 14 - 20 hours exposure at 3 g/m³, 4 - 10 hours at 6 g/m³ and 4 - 6 hours at 12 g/m³. The only other significant mortality difference between container types was increased survivorship in wooden containers for *C. cavifrons* after 6 hours at 3 g/m³ and 4 hours at 6 g/m³.

Termite mortality (mean \pm SE) observed 72 hours after exposure to sulfuryl fluoride at three concentrations

		Concer	ntration 3 g/m ³	
ET^1	C^2	C. formosanus	C. cavifrons	I. schwarzi
2	W	$0.0 \pm 0.0 aA$	$0.0\pm0.0aA$	$5.0\pm2.9aA$
2	Р	$0.2 \pm 0.2 aA$	$1.1 \pm 0.8 aA$	$6.7 \pm 6.7 aA$
4	W	$0.0 \pm 0.0 aA$	$1.8 \pm 1.8 aA$	10.0 ± 10.0 aA
4	Р	$11.3 \pm 9.8aA$	$1.6 \pm 0.9 aA$	$1.7 \pm 1.7 aA$
6	W	$0.0 \pm 0.0 aA$	$1.2 \pm 1.2aA$	$10.0 \pm 5.0 aA$
6	Р	11.5 ± 6.0 aA	$8.7\pm2.0aB$	$43.3 \pm 17.6 aA$
8	W	$0.0 \pm 0.0 aA$	$91.0 \pm 1.8 bA$	$88.3\pm9.3 bA$
8	Р	$99.0\pm0.8aB$	$98.0\pm2.0aA$	$98.3 \pm 1.7 aA$
10	W	36.9 ± 2.1 aA	$100.0\pm0.0 bA$	$100.0\pm0.0bA$
10	Р	$97.7\pm2.3aB$	$100.0\pm0.0aA$	$100.0\pm0.0 bA$
12	W	$70.5 \pm 12.8 aA$	$100.0\pm0.0aA$	$100.0\pm0.0 bA$
12	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0bA$
14	W	72.0 ± 5.3 aA	$100.0\pm0.0aA$	$100.0\pm0.0 bA$
14	Р	$98.5\pm2.1aA$	$100.0\pm0.0aA$	$100.0\pm0.0 bA$
16	W	77.0 ± 6.2 aA	$100.0\pm0.0 bA$	$100.0\pm0.0bA$
16	Р	$100.0\pm0.0aB$	$100.0\pm0.0aA$	$100.0\pm0.0bA$
18	W	75.3 ± 3.9aA	$100.0\pm0.0aA$	$100.0\pm0.0 bA$
18	Р	$100.0\pm0.0aB$	$100.0\pm0.0aA$	$100.0\pm0.0bA$
20	W	$74.3 \pm 4.1 aA$	$100.0\pm0.0aA$	$100.0\pm0.0bA$
20	Р	$100.0 \pm 0.0 aB$	100.0 ± 0.0 aA	$100.0 \pm 0.0 bA$

Dow AgroSciences RMS: Sweden	April 2004		Vikane		Doc III-B5		
Section B5.10.2	Efficacy Data						
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/03 Termites Simulated field study (Ref. Z3)						
	Concentration 6 g/m ³						
	ET^{1}	C^2	C. formosanus	C. cavifrons	I. schwarzi		
	2	W	0.0 ± 0.0 aA	$4.6 \pm 4.6 aA$	11.7 ± 11.7aA		
	2	Р	16.6 ± 14.1 aA	$4.0\pm0.7aA$	$23.3 \pm 4.4aA$		
	4	W	0.0 ± 0.0 aA	21.3 ± 6.7 bA	83.3 ± 7.3 cA		
	4	Р	$86.1 \pm 6.7 \mathrm{aB}$	$66.2 \pm 11.aB$	93.3 ± 3.3aA		
	6	W	0.0 ± 0.0 aA	$99.3 \pm 0.7 \text{bA}$	$100.0 \pm 0.0 bA$		
	6	Р	$94.6\pm2.8aB$	$99.3 \pm 0.7 aA$	100.0 ± 0.0 aA		
	8	W	$45.6 \pm 7.8 aA$	$100.0\pm0.0bA$	$100.0 \pm 0.0 bA$		
	8	Р	$99.2\pm0.8aB$	$100.0\pm0.0aA$	$100.0 \pm 0.0 aA$		
	10	W	$47.9 \pm 10.9 \text{aA}$	$100.0\pm0.0bA$	$100.0\pm0.0bA$		
	10	Р	$100.0\pm0.0aB$	$100.0\pm0.0aA$	$100.0\pm0.0aA$		
	12	W	$96.5\pm2.2aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$		
	12	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$		
	14	W	$93.6\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$		
	14	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$		
	16	W	$98.7 \pm 1.3 aA$	$100.0\pm0.0bA$	$100.0\pm0.0aA$		
	16	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$		
	18	W	$100.0\pm0.0aA$	$100.0\pm0.0aA$	100.0 ± 0.0 aA		
	18	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$		
	20	W	$97.9 \pm 1.1 aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$		
	20	Р	$100.0 \pm 0.0 aA$	$100.0 \pm 0.0 aA$	100.0 ± 0.0 aA		

Concentration 12 g/m³

ET^{1}	C^2	C. formosanus	C. cavifrons	I. schwarzi			
2	W	$0.0 \pm 0.0 aA$	$6.2 \pm 1.4aA$	$58.3 \pm 29.2aA$			
2	Р	$19.2\pm18.5aA$	$2.6 \pm 18.5 aA$	$26.7 \pm 15.9 \mathrm{aA}$			
4	W	$0.0 \pm 0.0 aA$	$76.7 \pm 23.3 aA$	$100.0\pm0.0bA$			
4	Р	$100.0\pm0.0aB$	$100.0\pm0.0aA$	$100.0\pm0.0aA$			
6	W	24.1 ± 11.3aA	$100.0\pm0.0 bA$	$100.0\pm0.0bA$			
6	Р	$100.0\pm0.0aB$	$100.0\pm0.0aA$	$100.0\pm0.0aA$			
8	W	$98.0 \pm 2.0 aA$	$100.0\pm0.0aA$	$100.0\pm0.0bA$			
8	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$			
10	W	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0bA$			
10	Р	100.0 ± 0.0 aA	$100.0 \pm 0.0 aA$	$100.0 \pm 0.0 aA$			
Dow RMS	AgroSciences : Sweden	April	2004	Vi	kane	Doc III-I	B5
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Section	on B5.10.2	Effic	cacy D	ata			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/03 Termites Simulated field study (Ref. Z3)					
		12	W	100.0 ± 0.0 aA	100.0 ± 0.0 aA	100.0 ± 0.0 aA	
		12	Р	$100.0 \pm 0.0 aA$	100.0 ± 0.0 aA	$100.0\pm0.0aA$	
		14	W	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$	
		14	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$	
		16	W	$100.0\pm0.0aA$	$100.0\pm0.0 bA$	100.0 ± 0.0 aA	
		16	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	100.0 ± 0.0 aA	
		18	W	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$	
		18	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	100.0 ± 0.0 aA	
		20	W	100. ± 0.0aA	$100.0\pm0.0aA$	100.0 ± 0.0 aA	
		20	Р	$100.0\pm0.0aA$	$100.0\pm0.0aA$	$100.0\pm0.0aA$	
		Data a conce row, c are no	are mean ntration or mean ot signif	ns of three replication, means followed us followed by the sticantly different at	tes. For each exposes by the same lowerce same uppercase lett P = 0.05 (Student-	sure time at each ease letter within a er within a column Newman-Keuls test).	
		sealed	exposition P = P	etri dish, vented.	ainer type, w = wo	oden enclosure,	
3.1.1	Dose/Efficacy curve	Not a	vailable	e from report.			
3.1.2	Begin and duration of effects	Initial period comp	mortal ls of ex leted 72	ity was recorded in posure to sulfuryl 2 hours after each o	nmediately for each fluoride. Assessme of the exposure peri	h of the given time ents of mortality were ods.	
3.1.3	Observed effects in the post monitoring phase	No un	usual e	ffect observed.			
3.2	Effects against organisms or objects to be protected	None	reporte	d.			
3.3	Other effects	None	reporte	d.			
3.4	Efficacy of the reference substance	Not aj	pplicab	le.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.	.1.				
3.6	Efficacy limiting factors	A dela compa also re of sult additi	ayed ac ared wi ecordec furyl flu on of w	tion of sulfuryl flu th the other two sp l in wooden contai uoride is low (750 vater to the <i>C. form</i>	oride was recorded ecies. A higher lev ners of this species. ppm at 25°C). It is <i>osanus</i> wood enclo	for <i>C. formosanus</i> vel of survival was . The water solubility considered that the sures, intended to	

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Sectio	n B5.10.2	Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/03 Te Simulated fie	ermites ld study (Ref. Z3)	
		prevent termite d moisture content possible different have contributed termite species.	esiccation, also impeded gas penetration. Higher in the <i>C. formosanus</i> containers, in conjunction tial physiological response to sulfuryl fluoride, r to the increased survivalship of this subterranea	er wood with a nay n
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEV FIELD	ANCE OF THE RESULTS COMPARED TO CONDITIONS)
4.1	Reasons for laboratory testing	Not applicable, s	tudy was a simulated field test.	
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions			
4.3.1	Application method	The procedure ad	lopted represented commercial practice.	
4.3.2	Test organism	The test insects, considered as eco for inclusion in the	<i>C. formosanus, C. cavifrons and I. schwarzr</i> , are pnomic important pests and therefore desirable s ne simulated field study.	pecies
4.3.3	Observed effect	The desired resul is to achieve 100 in the study achie conditions.	t through fumigation of termites with sulfuryl fl % control, i.e. eradication. Some of the dosages eved this result. These results were under field	uoride s tested
4.4	Relevance for read-across	The results achie considered releva habitats.	ved these drywood and subterranean species are ant to other termite species which occupy similar	r
		5 APPLIC	CANT'S SUMMARY AND CONCLUSION	
5.1	Materials and methods	Two drywood (In subterranean (Co study which was termites were obt species from woo structures to sulf Termites were co enclosures which for 20 hours for r undertaken immer removal.	<i>acisitermes minor</i> , <i>Cryptotermes cavifrons</i>) and <i>ptotermes formosanus</i>) termite species were use designed to represent field conditions. The dryp- ained from naturally infested logs and the subte oden traps. The termites were exposed in separa aryl fluoride at concentrations of 3, 6 and 12 g/m infined to vented Petri dishes and sealed wooder were removed from each structure at 2 hour int nortality assessments. These assessments were ediately on removal and up to 72 hours following	one d in the wood rranean te n ³ . h ervals g their
5.2	Reliability	Reliability indica accepted scientifi methodological d	tor 2: Study conducted in accordance with gene ic principles, possibly with incomplete reporting leficiencies, which do not affect the quality of re	rally 5 or elevant

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc 1	III-B5
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/03 Tern Simulated field	nites study (Ref. Z3)		
		results.			
5.3	Assessment of efficacy, data analysis and interpretation	The initial mortality significantly lower to hours after exposure three species. In we lower for <i>C. formos</i> elevated wood mois as a gas barrier and termite and the othe <i>formosanus</i> in wood hyperbolic concentr mortality from accu in wood enclosures	assessment of <i>C. formosanus</i> in han <i>I. schwarzi</i> and <i>C. cavifrons</i> mortality had stabilised and wa bod enclosures mortality at 72 ho <i>anus</i> . This effect was attributed ture content in the <i>C. formosanu</i> possible physiological difference r two species. In all combination l enclosures, 72 hour mortality for ation versus time function and re- mulated dosages of $28 - 49$ g-h/n required dosages of > 95 g-h/m ³	Petri dishes was . However by 72 s the same for all burs did remain to experimentally <i>s</i> enclosures acting es between this ns except for <i>C</i> . blowed a simple eached 100% m ³ . <i>C. formosanus</i> for 100% mortality.	
5.4	Conclusion	Complete control of the subterranean spe fluoride. To achiev higher minimum fur with the other two s moisture gas barrier	the drywood termites <i>I. minor</i> a ceies <i>C. formosanus</i> can be achie e 100% mortality for <i>C. formosa</i> migant concentration and time th pecies. This is because of the period which may be present in his specific terminal	nd <i>C. cavifrons</i> and eved with sulfuryl <i>nus</i> requires a reshold compared otential partial excies natural habitat.	Х
5.5	Proposed efficacy	Termites			
Specification Total control – eradicat		ication from wood material.			
		Evaluation by (Competent Authorities		
		EVALUATION BY	Y RAPPORTEUR MEMBER {	STATE	

	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 5.4: The first sentence should read: Complete control of the drywood termites <u><i>I. schwarzi</i></u> and <i>C. cavifrons</i> and the subterranean species <i>C. formosanus</i> can be achieved with sulfuryl fluoride.
Summary and conclusion	Applicant's summary and conclusion is adopted.

1.1 Test organisms - Termites

Criteria	Details
Family	Rhinotermitidae.
Species	<i>Coptotermes formosanus</i> (Common name: Formosan Subterranean Termite).
Source	Foraging groups from three colonies were taken from buried wooden traps located in Hallandale, Florida, USA. Termites were excised from the wood, separated from the debris, and stored in containers < 2 weeks before testing.
Life stage	Undifferentiated larvae of at least third instar and soldiers.
Mixed age population	Age not differentiated.
Number of termites in test	Larvae: 44 per treatment.
	Soldiers: three per treatment.

Criteria	Details
Family	Kalotermitidae.
Species	Crytotermes cavifrons, Incisitermes schwarzi.
Source	Whole colonies collected in dead wood logs located in Lauderdale, Florida, USA. Termites were excised from the wood, separated from the debris, and stored in containers for < 2 weeks before testing.
Life stage	<i>Crytotermes cavifrons</i> – pseudergates, first molt nymphs.
	Incisitermes schwarzi - pseudergates, soldiers.
Mixed age population	Age not differentiated.
Number of termites in test	<i>Crytotermes cavifrons</i> – 50 pseudergates or first molt nymphs per treatment
	<i>Incisitermes schwarzi</i> – 19 pseudergates and 1 soldiers or 20 pseudergates

1.2 Test system

Criteria	Details		
Test chamber	Mobile homes mounted on a tarmac surface served as the experimental fumigation chamber. These were covered with tarpaulins secured with clamps and sealed along the ground with sand. A resealable seam was positioned at the bottom of each ramp through which test insects could be removed.		
Number of chambers	Three mobiles homes received were used. The homes encompassed volumes of 368, 204 and 368 m ³ .		

Test insects introduction into chamber	Termites were confined to either vented Petri dishes or wooden enclosures. Plastic Petri dishes of 350 mm diameter fitted with single filter paper discs moistened with deionised water for <i>C. formosanus</i> and a small wood chip. The wooden enclosures were cut (11.4 x 11.4 cm) from heartwood timbers of <i>Pinus</i> <i>elliottii</i> . These cubes were drilled-chiselled along the grain from one side to form rectangular hollows (3.8 x 3.8 x 7.6 cm) surrounded on all sides by 3.8 cm thick walls. The 3.8 cm thick lids were attached by dual rear hinges and a front snap latch to firmly compress a lid mounted gasket when closed. Gaskets were cut from sheets of Nalgene closed cell resilient polyethylene foam which provided a water tight seal. External cracks on some of the wood surfaces were filled with silicon glue	
Measuring equipment	Sulfuryl fluoride concentration was measured by using a Fumiscope (thermal conductivity meter). Gas samples were drawn by a pump and measured successively from sampling hoses in entrance hallways before and after each cardboard box was removed.	

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was introduced weight for desired dosage through a hose which opened into a side room of each chamber.
Delivery method	Not given in report.
Dosage rate	The termites were exposed to three sulfuryl fluoride concentrations of 3, 6 and 12 g/m ³ for $2 - 20$ hours.

1.4 Test conditions

Criteria	Details
Substrate	Plastic Petri dishes of 350 mm diameter fitted with single filter paper discs moistened with deionised water for <i>C. formosanus</i> and a small wood chip. Wood containers used for <i>C. formosanus</i> were provisioned with 5 ml sand and 3 ml water before adding the termites.
Incubation temperature	Temperature within the fumigation chambers during the test period was $27.2 \pm 0.9^{\circ}$ C with ca. 90% relative humidity. The control group of insects was placed in a nearby building maintained at 30°C.
Moisture	Relative humidity within the fumigation chambers during the test period was ca. 90%. The control group of insects was placed in a nearby building maintained at 80% relative humidity.

Vikane

Section B5.10.2		Efficacy Data					
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/04 Termites Laboratory study (Ref. Z4)					
		1 REFERENCE: Z4, B5.10.2/04	Official use only				
1.1	Reference	La Fage, J.P., Jones, M., and Lawrence, T. (1982).					
		Department of Entomology, Louisiana Agricultural Experiment Station and Louisiana State University, Baton Rouge, Louisiana, 70803, USA.					
		A laboratory evaluation of the fumigant, sulfuryl fluoride (Vikane), against the Formosan termite <i>Coptotermes formosanus</i> Shiraki.					
		The International Research Group on Wood Preservation, Thirteenth Annual Meeting, May 1982. IRG Secretariat Drottning Kristinas väg 47C, S – 114 28 Stockholm Sweden.					
1.2	Data protection	Not protected.					
1.2.1	Data owner	Data in the public domain in published paper.					
1.2.2	Companies with letter of Access	Not relevant.					
1.2.3	Criteria for data protection	No data protection claimed.					
1.3	Guideline study	The studies were undertaken on the basis of sound principles of fumigation practice. The treatments were replicated to enable confidence in the results to be achieved.					
		The studies had two objectives:					
		1. To determine the effect of temperature on the efficacy of sulfuryl fluoride on termite control.					
		2 To determine whether sulfuryl fluoride can achieve penetration of termite nests so eradication can be achieved.					
1.4	Deviations	Not applicable as the study was not conducted to an international standard method.					
		2 METHOD					
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride					
2.1.1	Trade name/ proposed trade name	Vikane					
2.1.2	Composition of Product tested	Not available from report.					
2.1.3	Physical state and nature	Fumigant.					
2.1.4	Monitoring of active substance concentration	Not undertaken.					
2.1.5	Method of analysis	Not applicable.					

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy I	Data	
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/04 Laborator	4 Termites ry study (Ref. Z4)	
2.2	Reference substance	No reference	e substance was included in the study.	
2.2.1	Method of analysis for reference substance	Not applicat	ole.	
2.3	Testing procedure			
2.3.1	Test population / inoculum / test organism	See Table 1.	1.	
2.3.2	Test system	See Table 1.	2.	
2.3.3	Application of test substance	See Table 1.	3.	Х
2.3.4	Test conditions	See Table 1.	4.	
2.3.5	Exposure time	24 hours.		
2.3.6 Number of		Study 1 – Ef	fect of temperature on efficacy of sulfuryl fluoride.	
	replicates performed	Each temper replicated th	ature-concentration treatment combinations were each ree times.	1
		Study 2 – Pe	enetration of sulfuryl fluoride into termite nest.	
		Six replicate	s per treatment.	
2.3.7	Controls	Controls inc	luded.	
2.4	Examination			
2.4.1	Effect investigated	Study 1 – Ef	fect of temperature on efficacy of sulfuryl fluoride.	
2.4.2	Method for recording	Termite mor	tality.	
2.4.3	Intervals of examination	Mortality wa	as determined after 24 hours exposure to sulfuryl fluor	ride.
2.4.4	Statistics	Study 1 – Ef	fect of temperature on efficacy of sulfuryl fluoride.	
		Twenty temp replicated th experimenta	perature-dosage treatment combinations were each ree times using colony source as a blocking factor in t l design.	he
		Study 2 – Pe	netration of sulfuryl fluoride into termite nest.	
		Each treatme	ent was replicated six times.	
2.4.5	Post fumigation monitoring of termites	The total mo determined i	ortality effect of sulfuryl fluoride on termites was mmediately after fumigation.	
		3 RE	SULTS	
3.1	Efficacy	Study 1 – Ef	fect of temperature on efficacy of sulfuryl fluoride.	
		Following example and initial co	sposure of sulfuryl fluoride for 24 hours both temperation bad profound effects on efficacy. At 10°	ture C no

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2	Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/04 Term Laboratory stud	ites y (Ref. Z4)	

significant mortality was observed even at the highest gas concentration tested. At 20°C there was a dramatic increase in mortality at concentrations of 1.32 g/m³ (dosage, concentration x time Ct = 32 g-h/m³).

Percentage mortality of C. f	<i>formosanus</i> exposed to s	sulfuryl fluoride
f	for 24 hours	

Colony	Conc g/m ³		Temper	ature °C	
		10	20	30	40
А	Control	0	0	0	0
В	Control	0	0	0	0
С	Control	0	_2	0	_2
А	0.26	14	0	0	4
В	0.26	0	8	6	4
С	0.26	4	4	0	16
А	0.79	2	0	90	98
В	0.79	0	0	100	100
С	0.79	0	6	100	100
А	1.32	0	100	100	100
В	1.32	2	60	100	100
С	1.32	8	64	100	100
А	1.84	0	72	100	100
В	1.84	0	94	100	100
С	1.84	0	92	100	100
А	2.37	0	98	100	100
В	2.37	10	100	100	100
С	2.37	26	100	100	100

-² Controls lost due to accidental handling.

Study 2 – Penetration of sulfuryl fluoride into termite nest.

The study showed that sulfuryl fluoride could effectively diffuse through termite carton nest matrix to achieve control.

Effect of sulfuryl fluoride on groups of *C. formosanus* exposed to sulfuryl fluoride after diffusion through a disc of carton nest maxtrix. Exposure was 24 hours at 30°C.

Replicate	Conc g/m ³	Condition of termites after 24 hours (%		4 hours (%)
		Alive	Ataxic	$D + M^1$
1	Control	96	0	4
2	Control	96	0	4

Dow A	AgroSciences : Sweden	April 20	04	Vikane	<u> </u>	Doc	III-B5
Sectio	on B5.10.2	Efficacy	y Data				
Annex TNsG: Pt. III	Point IIB5.10 Pt. I-B5.10, -Ch. 6	B5.10.2 Labora	/04 Termite tory study (s Ref. Z4)			
		3	Control	96	0	4	
		4	Control	100	0	0	
		5	Control	88	6	6	
		6	Control	96	2	2	
		1	0.79	8	90	2	
		2	0.79	0	0	100	
		3	0.79	2	38	60	
		4	0.79	6	50	44	
		5	0.79	0	0	100	
		6	0.79	3	27	70	
		1	1.06	0	0	100	
		2	1.06	0	0	100	
		3	1.06	0	0	100	
		4	1.06	0	28	72	
		5	1.06	0	0	100	
		6	1.06	0	0	100	
		1	1.32	0	0	100	
		2	1.32	0	0	100	
		3	1.32	0	0	100	
		4	1.32	0	0	100	
		5	1.32	0	0	100	
		6	1.32	0	0	100	
		$^{1}D+M = I$	Dead + moribu	nd.			
3.1.1	Dose/Efficacy	Study 1 –	Effect of temp	erature on eff	ficacy of sulfu	ryl fluoride.	
	curve	The data suggests that the LD_{50} at 20°C was between 0.79 and 1.84 g/m ³ for exposure of 24 hours i.e., concentration x time (dosage) 19 – 44 g-h/m ³ . The data results in a steep slope of the dosage responses curve and the inherent difficulties of drawing small gas samples were such that acceptable LD_{50} values could not be obtained.					
3.1.2	Begin and duration of effects	Assessed	immediately at	fter 24 hours	exposure to su	lfuryl fluoride.	
3.1.3	Observed effects in the post monitoring phase	No unusu	No unusual effect observed.				
3.2	Effects against	None repo	orted.				

Dow RMS	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Section	on B5.10.2	Efficacy Data		
Annex TNsG Pt. III	x Point IIB5.10 : Pt. I-B5.10, -Ch. 6	B5.10.2/04 Term Laboratory stud	ites y (Ref. Z4)	
	organisms or objects to be protected			
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	No reference substar	ce was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEVAN FIELD CO	CE OF THE RESULTS CON NDITIONS	MPARED TO
4.1	Reasons for	4. Termites from d	ifferent colonies could be tested	d.
	laboratory testing	5. Different dosage	es could be tested.	
		6. Practical, accura	te procedure.	
		Data generated is con obtained from the fie	nsidered relevant for field of us ld.	e. Test insects
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions			
4.3.1	Application method	The principle of fum sufficient period of t target pest. There ar to achieve this althou	igation is to confine a sufficien ime to enable a toxic dose to be e a number of ways in laborator igh the principle is the same.	t concentration for a received by the ry and field studies
4.3.2	Test organism	There are many diffe formosanus, is consid	rent pest species of termites; th dered as being of economic imp	e species tested, <i>C</i> . portance.
4.3.3	Observed effect	The desired result the is to achieve 100% c two studies achieved	rough fumigation of termites w ontrol, i.e., eradication. Some this result.	ith sulfuryl fluoride dosages tested in the
4.4	Relevance for read-across	The result achieved f subterranean termite	for <i>C. formosanus</i> is considered species.	relevant to other

Dow RMS	AgroSciences 5: Sweden	April 2004	Vikane	Doc III-B5
Secti	ion B5.10.2 x Point IIB5.10	Efficacy Data		
TNsG Pt. II	3: Pt. I-B5.10, I-Ch. 6	B5.10.2/04 Terr Laboratory stu	nites dy (Ref. Z4)	
		5 APPLICA	NT'S SUMMARY AND CON	NCLUSION
5.1	Materials and methods	The first study was the efficacy of sulfu species of <i>Coptoter</i> from naturally occu Termites were expo chambers for 24 ho Mortality assessmen period.	undertaken to determine the eff rryl fluoride on the control the s <i>mes formosanus</i> . Termites colo rring infestations and used as s used to sulfuryl fluoride in labor urs at four temperatures, 10. 20 nts were made immediately after	fect of temperature on subterranean termite onies were collected tock cultures. ratory fumigation , 30 and 40°C. er the exposure
		The second study w diffuse through cart control. Carton ness from roof voids. M barriers to prevent t (termite source as for 30°C and three cond Mortality assessment period.	vas undertaken to determine if s on nests build by <i>C. formosanu</i> t matrix was available from inf atrix discs from the nest materi he ingress of sulfuryl fluoride t or the first study). Exposure tir centrations were tested 0.79, 1.0 nts were made immediately after	ulfuryl fluoride could as to achieve effective estations removed al were used as o the termite bioassay ne was 24 hours at 06 and 1.32 g/m ³ . er the exposure
5.2	Reliability	Reliability indicator accepted scientific j methodological def results.	r 2: Studies conducted in accord principles, possibly with incom iciencies, which do not affect th	dance with generally plete reporting or he quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The first study show against the subterra exposed at tempera fumigation failed to concentration. Ver- concentrations of 0.	ved that the fumgiant sulfuryl finean termite species <i>Coptoterm</i> tures from $20 - 40^{\circ}$ C for 24 hou achieve effective control regary high or total mortality was ob 79 g/m ³ or higher.	luoride was effective <i>tes formosanus</i> when arsAt 10°C the rdless of initial gas served at
		The second study sl sulfuryl fluoride the <i>formosanus</i> was sul concentrations > 1.0	nowed that at 30°C for 24 hours prough the carton nest matrix co fficient to achieve high mortalit 06 g/m ³ .	s penetration of onstructed by <i>C</i> . y with gas
5.4	Conclusion	Sulfuryl fluoride is <i>formosanus</i> at temp penetrate into the ne	highly effective at controlling t eratures above 20°C. The fumi est of this species.	the termite species C. gant can effectively
5.5	Proposed efficacy	Termites		
	specification	Total control – erad	lication from wood material	

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 2.3.3: There are some misprints and missing information in Table 1.3 Application of test substance:
	Dosage rate (Study 1): The concentration of sulfuryl fluoride were and 2.37 g/m ³ .
	Dosage rate (Study 2): The concentration of sulfuryl fluoride were and 1.32 g/m^3 . The termites were exposed for 24 hours.
Summary and conclusion	Applicant's summary and conclusion is acceptable.

Criteria	Details
Family	Rhinotermitidae.
Species	Coptotermes formosanus.
Source	Colonies collected from naturally infested cypress wood located in a swamp in Louisiana, USA These were made after several days of near to below freezing temperatures when termites were inactive and concentrated close to or totally within carton nests. Under these conditions a one or two metre snag of wood was removed from just above the water line which provided large numbers of termites in a small quantity of wood. The complete stock colonies were maintained in the laboratory in metal containers. The colonies were provisioned with supplementary food (southern yellow pine boards) and moisture as necessary.
Life stage	Various.
Mixed age population	Colonies contained mixed age population.
Number of termites in test	<u>Study 1 – Effect of temperature on efficacy of</u> <u>sulfuryl fluoride</u> Fifty forager termites per treatment
	<u>Study 2 – Penetration of sulfuryl fluoride into termite</u> <u>nest</u>
	Fifty forager termites per treatment

1.1 Test organisms - Termites

1.2	Test	system
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Criteria	Details
Test chamber	The fumigation vessel consisted of ca. 3.8 litre wide- mouth glass jar fitted with a metal screw cap through which sulfuryl fluoride was injected. Plastic tape was used to seal the lid and gas entry port. Gas circulation

	was achieved in the chamber with a small metal fan blade placed in the bottom of the chamber and made to turn with a magnetic stirrer placed under the chamber.
Number of chambers	Not given in report.
Test insects introduction into chamber	<u>Study 1 – Effect of temperature on efficacy of</u> <u>sulfuryl fluoride</u>
	Termites were transferred from the stock colonies to 30 ml plastic cups containing ca. 12 ml of agar which provided an attractive substrate for gallery building and also provided the required moisture. Groups of 50 foragers held in the cups without supplemental food survived at least 30 days with negligible mortality. Termites were conditioned at test temperatures for $12 - 24$ hours in the agar cups prior to beginning the sulfuryl fluoride exposure tests.
	<u>Study 2 – Penetration of sulfuryl fluoride into termite</u> <u>nest</u>
	Carton termite matrix was available from infestations removed from wall voids. Carton matrix discs 10 cm in diameter and 8.9 cm thick were cut from larger pieces using a band saw and glued into the ends of 30 cm long, 10 cm diameter Schedule 40 polyvinyl chloride sewer pipes. A second piece of pipe was added to extend the overall length to 44.5 cm. The volume of the apparatus with end covers in place was ca. 3.8 litres. The entire apparatus was submerged in water for 24 hours to saturate the carton material. Fifty <i>C. formosanus</i> foragers taken from stock laboratory colonies were conditioned in agar cups and placed in the short end of the test apparatus. Sulfuryl fluoride samples were infected through the hole in the cover of the long chamber and the unit transferred to a bioclimatic chamber. Placement was horizontal to allow the gas to flow toward the carton discs.
Measuring equipment	Gas samples were drawn with a gas syringe to inject the require amount – See 1.3 below.

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in demonstration bottle without a dip tube.
Delivery method	<u>Study 1 – Effect of temperature on efficacy of</u> <u>sulfuryl fluoride</u>
	The sulfuryl fluoride bottle was connected directly to a brass needle valve fitting which allowed slight adjustment in the gas flow rate. The delivery tube was circulated through a heated water bath to provide gas at a temperature of 20°C. Gas samples were drawn with a gas syringe and injected into the fumigation chamber.
	<u>Study 2 – Penetration of sulfuryl fluoride into termite</u> <u>nest</u>
	See Table 2.1.
Dosage rate	<u>Study 1 – Effect of temperature on efficacy of</u> <u>sulfuryl fluoride</u>
	The concentrations of sulfuryl fluoride were 0.26, 0.79, 1.32, 1.84 and $2.37/m^3$. The termites were exposed for 24 hours.
	<u>Study 2 – Penetration of sulfuryl fluoride into termite</u> <u>nest</u>
	The concentrations of sulfuryl fluoride were 0.79, 1.06 and 1.32 g/m ³ .

1.3 Application of test substance

1.4 **Test conditions**

Criteria	Details
Substrate	<u>Study 1 – Effect of temperature on efficacy of</u> <u>sulfuryl fluoride</u>
	Agar contained in plastic cups.
	<u>Study 2 – Penetration of sulfuryl fluoride into termite</u> <u>nest</u>
	See Table 2.1.
Incubation temperature	<u>Study 1 – Effect of temperature on efficacy of</u> <u>sulfuryl fluoride</u>
	Termites were exposed to sulfuryl fluoride at four temperatures; 10, 20, 30 and 40°C.
	<u>Study 2 – Penetration of sulfuryl fluoride into termite</u> <u>nest</u>
	Termites were exposed to sulfuryl fluoride at 30°C.
Moisture	Not given in report.

Vikane

Section B5.10.2		Efficacy Data				
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/05 Pine wood nematode Simulated field study (Ref. Z5)				
		1 REFERENCE: Z5, B5.10.2/05	Official use only			
1.1	Reference	¹ Soma, Y., ¹ Naito, H., ¹ Misumi, T., ¹ Mizobuchi, M., ¹ Tsuchiya, Y., ¹ Matsuoka, I., ¹ Kawakami, F., ² Hirata, K., and ³ Komatsu, H. (2001).				
		¹ Chemical and Physical Control Laboratory, Research Division, Yokohama Plant Protection Station, MAFF, Japan.				
		² Research Division, Yokohama Plant Protection Station, MAFF, Japan.				
		³ Research Laboratory, Japan Fumigation Technology Association, Tokyo, Japan.				
		Effects of some fumigants on pine wood nematode, <i>Buraphelenchus xylophilus</i> , infecting wooden packages.				
		1. Susceptibility of pine wood nematode to methyl bromide, sulfuryl fluoride and methyl isothiocyanate.				
		Research Bulletin Plant Protection, Japan, 2001, Number 37, pages 19 – 26.				
1.2	Data protection	Not protected.				
1.2.1	Data owner	Data in the public domain in published paper.				
1.2.2	Companies with letter of Access	Not relevant.				
1.2.3	Criteria for data protection	No data protection claimed.				
1.3	Guideline study	The studies were undertaken on the basis of sound principles of fumigation practice.				
1.4	Deviations	Not applicable as the study was not conducted to an international standard method.				
		2 METHOD				
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.				
2.1.1	Trade name/ proposed trade name	Vikane.				
2.1.2	Composition of Product tested	≥ 99% Sulfuryl fluoride.				
2.1.3	Physical state and nature	Fumigant.				
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a gas chromatograph.				
2.1.5	Method of analysis	Not applicable.				
2.2	Reference	Two references were included in the study, methyl bromide (purity of \geq				

Dow A RMS:	AgroSciences Sweden	April 2004 Vikane Doc	III-B5
Sectio	on B5.10.2	Efficacy Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/05 Pine wood nematode Simulated field study (Ref. Z5)	
	substance	99%) and methyl isothiocyanate (30% in CO_2).	
2.2.1	Method of analysis for reference substance	Not applicable.	
2.3	Testing procedure		
2.3.1	Test population / inoculum / test organism	See Table 1.1.	
2.3.2	Test system	See Table 1.2.	
2.3.3	Application of test substance	See Table 1.3.	
2.3.4	Test conditions	See Table 1.4.	
2.3.5	Exposure time	24 hours.	Х
2.3.6	Number of replicates performed	Five pieces of board and three pieces of lumber per treatment.	
2.3.7	Controls	Non-fumigated wooden samples were included as the controls.	
2.4	Examination		
2.4.1	Effect investigated	Nematode mortality.	
2.4.2	Method for recording	Fumigated and control wooden material were placed in netted bags and stored at ambient temperature until detection of the nematode by Bermann funnel method.	
		Wooden pieces were taken from a few places in the fumigated and untreated control samples by saw separately and then by cutting them into the smaller pieces of $3 \text{mm} \times 3 \text{mm} \times 5 \text{mm}$ with scissors. The samples of $10 - 20g$ were placed in a Bermann funnel for 24 hours at room temperature. Surviving nematodes were counted using microscopes.	
2.4.3	Intervals of examination	Mortality was determined $6 - 7$ and $20 - 21$ days after fumigation.	
2.4.4	Statistics	Not available from report.	
2.4.5	Post fumigation monitoring of nematodes	See 2.4.3.	
		3 RESULTS	
3.1	Efficacy	Gas concentration and dosages (CT products - concentration x time)	
		The ratios of residual gas concentration at the end of fumigation for 24 and 48 hours for sulfuryl fluoride were more than 95% while average ratios for 24 and 48 hours were 3.3% and 2.7% for methyl isothiocyanate and 58.1% and 54.6% for methyl bromide respectively.	

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2	Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/05 Pine Simulated field	wood nematode study (Ref. Z5)	

These data indicate that both methyl iosothiocyanate and methyl bromide are absorbed onto wooden material.

Ratios of residual gas and Ct (concentration x time) products for the red pine infested with pine wood nematode fumigated with sulfuryl fluoride, methyl bromide and methyl isothiocyanate at 25% (v/v) load factor and 15°C for 24 and 48 hours.

Fumigant ¹	Conc ⁿ g/m ³	Ratio of 1	esidual gas	Ct prod	uct g-h/m ³
		24	48	24	48
SF	30	97.8	-	765	-
SF	60	98.5	95.0	1539	2932
MB	20	58.0	-	313	-
MB	40	59.3	53.8	631	1174
MB	60	57.3	54.3	900	1704
MB	80	57.7	55.8	1188	2277
MITC	20	3.5	3.0	32	47
MITC	40	3.0	2.3	53	78

 1 SF = sulfuryl fluoride, MB = methyl bromide, MITC = methyl isothiocyanate

Mortality of pine wood nematodes in boards

Nematode survival was recorded following fumigation of red pine boards with sulfuryl fluoride and for some of the methyl bromide treatments; no survival was recorded following the methyl isothiocyanate treatments.

Mortality of pine wood nematode infested red pine board 2 cm thick fumigated with sulfuryl fluoride, methyl bromide and methyl isothiocyanate at 25% (v/v) load factor and 15°C for 24 and 48 hours (mortality was assessed on samples 6 – 7 days after fumigation).

Fumigant ¹	Conc ⁿ	Ex. time	Moisture	No. nen	natodes	Survivor
	g/m ³	hours	%	per 1	00g	%
			$BF^2 AF^3$	BF	AF	
SF	60	24	27.3 10.5	20400	2704	13.3
SF	60	48	27.3 12.7	20400	1227	6.0
MB	20	24	28.2 23.1	69900	1522	2.2
MB	40	24	25.1 22.4	36500	4.7	0.01
MB	40	48	31.5 22.9	57800	0	0.0
MB	60	24	30.6 22.7	53600	0	0.0
MB	60	48	27.8 21.3	62200	0	0.0

Dow AgroSciences RMS: Sweden	April 200)4		Vikane			Doc I	II-B5
Section B5.10.2	Efficacy	Data						
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/ Simulate	05 Pine ed field	e wood n study (l	ematode Ref. Z5)				
	MB	80	24	29.4 24.8	41500	0	0.0	
	MB	80	48	33.2 39.6	33300	0	0.0	
	MITC	20	24	27.2 23.0	57200	0	0.0	
	MITC	20	48	26.1 22.9	68000	0	0.0	
	MITC	40	24	26.4 23.5	45200	0	0.0	
	MITC	40	48	27.2 22.3	45500	0	0.0	
	Control	0	48	25.8 22.3	39000	33300	85.4	

 1 SF = sulfuryl fluoride, MB = methyl bromide, MITC = methyl isothiocyanate

 $^{2}BF = Before fumigation$

 $^{3}AF = After fumigation$

Mortality of pine wood nematodes in lumber

Nematode survival was recorded following fumigation of red pine boards with sulfuryl fluoride and for some of the methyl bromide treatments; no survival was recorded following the methyl isothiocyanate treatments.

Mortality of pine wood nematode infested red pine lumber 15 cm² fumigated with sulfuryl fluoride, methyl bromide and methyl isothiocyanate at 25% (v/v) load factor and 15°C for 24 and 48 hours (mortality was assessed on samples 20 - 21 days after fumigation). Х

Fumigant ¹	Conc ⁿ	Ex. time	Mois	sture	No. ner	natodes	Survivor
	g/m ³	hours	Q	%	per 1	00g	%
			BF^2	AF ³	BF	AF	
SF	30	24	27.7	21.7	20500	3819.0	18.6
SF	60	24	20.1	11.7	22700	453.7	2.0
SF	60	48	20.1	11.7	22700	77.8	0.34
MB	20	24	57.2	27.4	18400	1584.0	8.6
MB	40	24	30.5	13.7	79400	42.4	0.18
MB	60	24	30.5	13.7	79400	0	0.0
MITC	20	24	33.2	14.2	42300	0	0.0
MITC	20	48	46.1	25.7	25900	0	0.0
Control	0	48	33.4	12.2	35500	53100	149.6

 1 SF = sulfuryl fluoride, MB = methyl bromide, MITC = methyl isothiocyanate

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio	n B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point 11B5.10 Pt. I-B5.10, Ch. 6	B5.10.2/05 Pine woo Simulated field stud	od nematode ly (Ref. Z5)	
		$^{2}BF = Before fumigation$	L	
		3 AF = After fumigation		
3.1.1	Dose/Efficacy curve	Not available from repor	t.	
3.1.2	Begin and duration of effects	Assessments for mortalit and 48 hours exposure to methyl bromide and met	y undertaken at $6-7$ and $20-2$ sulfuryl fluoride and the reference hyl isothiocyanate.	1 days after 24 nce products
3.1.3	Observed effects in the post monitoring phase	No unusual effect observ	red.	
3.2	Effects against organisms or objects to be protected	None reported.		
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	See 3.1.		
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEVANCE FIELD COND	OF THE RESULTS COMPA ITIONS	RED TO
4.1	Reasons for laboratory testing	Not applicable, study wa	s a simulated field test.	
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions			
4.3.1	Application method	The procedure adopted r	epresented commercial practice.	
4.3.2	Test organism	Pine wood nematode, <i>Bu</i> being of economic important authorities in many count materials such as pallets.	trance to the forestry industry. F trance to the forestry industry. F tries require treatment of import crates and boxes for disinfestat	nsidered as Plant quarantine ed wooden ion of this pest

Dow A	AgroSciences : Sweden	April 2004	Vikane	Doc I	II-B5
Sectio	on B5.10.2 Point IIB5.10	Efficacy Data			
TNsG: Pt. III-	e Pt. I-B5.10, -Ch. 6	B5.10.2/05 Pin Simulated field	e wood nematode 1 study (Ref. Z5)		
		to prevent its sprea	ad.		
4.3.3	Observed effect	The desired result sulfuryl fluoride is the dosages tested	through fumigation of pine wood to achieve 100% control, i.e., er at 15°C achieved this result.	d nematodes with radication. None of	
4.4	Relevance for read-across	The data generated pest occurs.	t is relevant for pine wood nema	tode where ever this	
		5 APPLIC	ANT'S SUMMARY AND CON	NCLUSION	
5.1	Materials and methods	The stimulated fie sulfuryl fluoride o <i>Bursaphelenchus a</i> lumber at 15°C. T and 60 g/m ³ and th and 30% methyl is fumigants at a rang exposures. Natura 10000 nematodes Nematodes were d assessments were	Id study was undertaken to detern n the control the pine wood nema <i>cylophilus</i> , infesting conifer woo he concentrations of sulfuryl flu- ie exposure times 24 and 48 hours othiocyanate in CO ₂ were include ge of concentrations and at 24 and illy infested test wood materials is per 100g of the sample was used letected using the Bermann funn- completed $6 - 7$ and $20 - 21$ day	mine the efficacy of atode, den boards and oride tested were 30 rs. Methyl bromide ded as the reference ad 48 hours including more than for the tests. el method. Mortality rs after fumigation.	
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accorda principles, possibly with incom- ficiencies, which do not affect th	nce with generally plete reporting or ne quality of relevant	
5.3	Assessment of efficacy, data analysis and interpretation	Sulfuryl fluoride a nematodes at 15°C purposes a treatme would be required higher temperature	chieved a high level of mortality at some of the concentration test ont programme to achieve comple. It is possible than sulfuryl fluo es would achieve this result.	y of pine wood sted. For quarantine ete disinfestation ride fumigation at	
5.4	Conclusion	Sulfuryl fluoride h pine wood nemato would improve the	as the potential of achieving a hi de. Fumigation at temperatures e efficacy of the fumigant.	igh level of control of higher than 15°C	
5.5	Proposed efficacy specification	Total control – era	dication from wood material		Х

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 2.3.5 Exposure time: Should be 24 hours and 48 hours.
	Field 3.1: Nematode survival was recorded following fumigation of <u>lumber</u> with sulfuryl fluoride
	Field 5.5 Proposed efficacy specification: None of the dosages tested achieved 100% control, i.e. eradication. Therefore the proposed efficacy specification should read e.g. high mortality was achieved.
Summary and conclusion	Applicant's summary and conclusion is adopted with the proposed modification of the efficacy specification.

Criteria	Details
Species	Bursaphelenchus xylophilus.
Source	Red pine, <i>Pinus densiflora</i> , naturally infested with the pine wood nematode were collected and sawn into boards (2cm thick x 15cm wide x 30cm long) and lumber (15 cm thick x 15 cm wide x 30 cm long in size). Five pieces of board and three pieces of lumber were tied up into a bundle by plastic bands. Board and lumber of the same size as the test samples were also prepared as filler materials for achieving a certain fumigation loading. The filler was always placed outside the bundle.
Life stage	The stage of the nematode in a series of the test accounted for preceding the dispersal 3 rd and 4 th stage larvae to more than 90% of the nematode in each sample.
Mixed age population	Not available from report.
Number of nematodes in test	The number of pine wood nematodes in the test wooden material was always confirmed before fumigation. The wooden materials included more than 10,000 nematodes per 100 g of the sample were used for the tests.

11	Test	organism .	_ Pine	wood	nematode
1.1	rest	organism -	- r me	woou	nematoue

1.2 Test system

Criteria	Details		
Test chamber	The test chamber to simulate field fumigation conditions consisted of a 100 litre fibre-glass fumigation box measuring 50cm x 40cm x 50cm.		
Number of chambers	Not available from report.		
Test insects introduction into chamber	The bundle of test wooden material was placed in the fumigation chamber with 25% loading again to stimulate field fumigation conditions (which would normally take place in a warehouse) and stored overnight at 15°C.		
Measuring equipment	Gas concentrations during fumigation were monitored periodically with gas chromatography. Temperature was also recorded with an automatic recorder (Hybrid recorder AH, Chino).		

1.3 Application of test substance

Criteria	Details
Application procedure	Not available from report.
Delivery method	For sulfuryl fluoride and methyl bromide prescribed amounts were collected in a syringe and then introduced in the fumigation chamber. Methyl isothiocyanate was introduced directly from a cylinder by measuring a prescribed amount.
Dosage rate	Fumigation exposure periods were 24 and 48 hours.
	Concentrations
	Sulfuryl fluoride: 30, 60 g/m ³
	Methyl bromide: 20, 40, 60, 80 g/m ³
	Methyl isothiocyanate: 30% in CO ₂

1.4 Test conditions

Criteria	Details
Substrate	Red pine, Pinus densiflora.
Incubation temperature	Pre-conditioning of test material and during fumigation completed at 15°C.
Moisture	Average moisture content in test wood lumber
	Before fumigation 20.1 – 57.2%
	After fumigation 11.7 – 27.4%

Vikane

Section B5.10.2 Efficacy Data			
Annex TNsG: Pt. III	Point IIB5.10 Pt. I-B5.10, -Ch. 6	B5.10.2/06 Pine wood nematode Laboratory and field studies (Ref. Z6)	
		1 REFERENCE: Z6, B5.10.2/06	Official use only
1.1	Reference	¹ Dwinell, L. D., ² Thoms, E., and ³ Prabhakaran, S. (2003).	
		¹ United States Department of Agriculture Forestry Service, Athens, Georgia, USA.	
		² Dow AgroSciences LLC, Gainesville, Florida, USA.	
		³ Dow AgroSciences LLC, Indianapolis, Indiana, USA.	
		Exploratory research on sulfuryl fluoride fumigation to eradicate the pine wood nematode in unseasoned pine lumber.	
		Annual International Research Conference on Methyl Bromide Alternatives and Emission Reduction, 2003, San Diego, California, USA.	
1.2	Data protection	Not protected.	
1.2.1	Data owner	Data in the public domain in published paper.	
1.2.2	Companies with letter of Access	Not relevant.	
1.2.3	Criteria for data protection	No data protection claimed.	
1.3	Guideline study	The studies were undertaken on the basis of sound principles of fumigation practice.	
1.4	Deviations	Not applicable as the study was not conducted to an international standard method.	
		2 METHOD	
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride	
2.1.1	Trade name/ proposed trade name	Vikane.	
2.1.2	Composition of Product tested	≥ 99% Sulfuryl fluoride.	
2.1.3	Physical state and nature	Fumigant.	
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope thermal conductivity meter.	
2.1.5	Method of analysis	Not applicable.	
2.2	Reference substance	No reference substance was included in the study.	
2.2.1	Method of analysis for reference	Not applicable.	

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Section	on B5.10.2	Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/06 Pine woo Laboratory and fie	od nematode ld studies (Ref. Z6)	
	substance			
2.3	Testing procedure			
2.3.1	Test population / inoculum / test organism	See Table 1.1.		
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of test substance	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Exposure time	Two laboratory studies 2	4 hours. Field fumigation 7.	5 hours.
2.3.6	Number of replicates performed	In the first laboratory stu twice. The second labor chamber fumigation trea	dy each chamber treatment w atory study was not replicated tment was replicated six time	vas replicated d. The field s.
2.3.7	Controls	Single untreated controls Three untreated controls	were included both of the la were included in the field fur	boratory studies. migation study.
2.4	Examination			
2.4.1	Effect investigated	Occurrence of pine wood	l nematode.	
2.4.2	Method for	Laboratory studies		
	recording	A thin section of wood w nematodes extracted usin occurrence of the pine w expressed as percent of s	was sawn from the centre of the ng the Baermann funnel proce ood nematode in the sticks w ticks positive for pine wood	ne pine sticks and edure. The as recorded and nematode.
		Field fumigation		
		After fumigation the boa by drilling two 2.5 cm ho nematodes from the bori slabs were examined for moisture content, expres drying a second set of we	rds were sampled for the pine oles with an auger bit and ext ngs using the Baermann funn pine sawyer exit holes in July sed on a dry weight basis, wa bod wafers at 105°C for 24 ho	e wood nematode racting the el procedure. The y. The wood s determined by purs.
2.4.3	Intervals of examination	Post fumigation.		
2.4.4	Statistics	Not available from repor	t.	
2.4.5	Post fumigation monitoring of nematodes	See 2.4.3.		
		3 RESULTS		
3.1	Efficacy	Laboratory studies		
		In the first study conduct were positive for pine we concentration of sulfuryl (Ctp) of 694 g-h/m ³ and accumulated dosage of 1	ted at 20°C, 70% of the short bod nematode following expo fluoride at 30 g/m ³ and an ac 10% were positive at 60 g/m ³ 393 g-h/m ³ . However when	eaf pine sticks posure to a ccumulated dosage and an sulfuryl fluoride

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2	Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/06 Pine Laboratory and	wood nematode field studies (Ref. Z6)	

was held at 60 g/m³ for 24 hours and the temperature increased to 25 and 30°C (accumulated dosage of 1420 and 1426 g-h/m³ respectively) none of the pine sticks were positive for the nematode.

Percentage of shortleaf pine sticks with PWN (pine wood nematode) before and after fumigation with SF (sulfuryl fluoride) at 30 and 60 g/m³ at 20°C for 24 hours.

Treatment	Dosage	% of sticks po	ositive for PWN
SF g/m ³	g-h/m ³	Before Fum.	After Fum.
30	694	100	70
60	1393	100	10
Control	0	100	100

Percentage of shortleaf pine sticks with PWN (pine wood nematode) before and after fumigation with SF (sulfuryl fluoride) at 60 g/m³ at 25° and 30oC for 24 hours.

Treatment	Dosage	% of sticks posit	ive for PWN
Temp. °C	g-h/m ³	Before Fum.	After Fum.
25	1420	100	0
30	1426	100	0
Control	0	100	100

Field fumigation

In the field fumigation it was necessary to add sulfuryl fluoride after about 4.5 hours and the exposure was terminated after about 7.5 hours when the targeted dosages (Ctps) were obtained. The resulting accumulated dosages ranged from 997 - 1751 g-h/m³ in the fumigation chambers. The mean and maximum temperatures for the chambers during fumigation averaged 35.3 and 40.9°C respectively. No nematodes were extracted from the lumber in any of the fumigation treatments.

Accumulated dosages (Ctps) in field fumigation chambers to eradicate pine wood nematode from infested lumber

	-			
Chamber	Time 1 ^a	Time 2 ^a	Total SF g	Dosage g-h/m ^{3b}
1	102	357	459	1751
2	102	533	635	1039
3	103	345	447	1538
4	244	78	322	1506
5	153	317	470	1192
6	153	357	510	997

^aTime 1 = 0; Time 2 = 4.5 hours. Time 2 concentrations increased to

Dow A RMS	AgroSciences : Sweden	April 2004	V	ïkane			Doc III-B5
Sectio	on B5.10.2	Efficacy Data					
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/06 Pine wood nematode Laboratory and field studies (Ref. Z6)					
		compensate for rap	id gas loss	from the c	chamber.		
		^b Dosages corrected CO ₂ by monitoring	l for atmosp non-fumig	heric char ated contr	nges, e.g. rela ols.	ative humid	ity and
		Efficacy of sulfur from infested lum	ryl fluoride ber of diffo	e in eradie erent size	cation of pin s in field fur	e wood ner nigation ch	natode ambers
		Lumber size cm ^a	% WMC ^b	%	Lumber pos	itive for PW	/N
				Non-fu	migated	Fumig	gated
				Pre	Post	Pre	Post
		2.5 x 15 x 96.5	34	90	89	90	0
		5 x 12.7 x 96.5	37	93	83	93	0
		12.7 x 12.7 x 96.5	32	84	74	84	0
		^a Each chamber load mean of six fumiga chambers.	d consisted tion chamb	of 13 piec ers and th	ces of each si tree non-fum	ze. Data is igated contr	the rol
		^b Mean wood moist	ure content,	expresse	d on a dry we	eight basis.	
3.1.1	Dose/Efficacy curve	Not available from	report.				
3.1.2	Begin and duration of effects	Before and after fu	migation.				
3.1.3	Observed effects in the post monitoring phase	No unusual effect o	observed.				
3.2	Effects against organisms or objects to be protected	None reported.					
3.3	Other effects	None reported.					
3.4	Efficacy of the reference substance	No reference subst	ance used.				
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.					
3.6	Efficacy limiting factors						
3.6.1	Occurrences of resistances	None reported.					

Dow AgroSciences RMS: Sweden		April 2004VikaneDo	c III-B5		
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/06 Pine wood nematode Laboratory and field studies (Ref. Z6)			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for laboratory testing	Laboratory studies were included to refine the dosage rates in preparation for the field fumigation.			
4.2	Intended actual scale of biocide application	The scale of the fumigation only limited to the size of the fumigated chamber.			
4.3	Relevance compared to field conditions	Field fumigation included.			
4.3.1	Application method	The procedure adopted represented commercial practice.			
4.3.2	Test organism	Pine wood nematode, <i>Bursaphelenchus zylophilus</i> , is considered as being of economic importance to the forestry industry. Plant quarantir authorities in many countries require treatment of imported wooden materials such as pallets, crates and boxes for disinfestation of this pes to prevent its spread.	e t		
4.3.3	Observed effect	The desired result through fumigation of pine wood nematodes with sulfuryl fluoride is to achieve 100% control, i.e., eradication. In the laboratory studies this was achieved following fumigation at 25 and 30°C at a dosage of 1460 g-h/m ³ . Complete control was also achieved in the field fumigation at an average temperature of 35.3 and 40.9°C at a dosage range from 997 – 1751 g-h/m ³			
4.4	Relevance for read-across	The data generated is relevant for pine wood nematode where ever this pest occurs.			
		5 APPLICANT'S SUMMARY AND CONCLUSION			
5.1	Materials and methods	Two laboratory chamber studies and one field fumigation were undertaken to determine the accumulated dosage (CT, concentration x time) of sulfuryl fluoride to eradicate naturally occurring pine wood nematode, <i>Burasphelenchus xylophilus</i> , from unseasoned shortleaf pin <i>Pinus echinata</i> . The efficacy of sulfuryl fluoride was tested at different temperatures ranging from $20 - 30^{\circ}$ C in the laboratory studies and $35.2 - 40.9^{\circ}$ C in the field fumigation at a range of dosages. The test pine material was cut into sticks for the laboratory studies and three sizes of lumber for the field fumigation. Assessment of the presence of pine wood nematode before and after fumigation was undertaken using the Baermann procedure.	e, t		
5.2	Reliability	Reliability indicator 2: Study conducted in accordance with generally accepted scientific principles, possibly with incomplete reporting or methodological deficiencies, which do not affect the quality of relevan results.	X		
5.3	Assessment of efficacy, data analysis and	Sulfuryl fluoride achieved complete eradication of pine wood nematodes in the laboratory chambers following fumigation at 25 and 30°C at a dosage of 1460 g-h/m ³ . Complete control was also achieved	X		

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5		
Section B5.10.2		Efficacy Data				
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/06 Pin Laboratory an	e wood nematode ad field studies (Ref. Z6)			
	interpretation	in the field fumigation at a average temperature of 35.3 and 40.9°C				
5.4	Conclusion	Sulfuryl fluoride can achieve complete eradication of pine wood nematode from infested pine wood.				
5.5	Proposed efficacy specification	Total control – eradication from wood material				
		Evaluation by	Competent Authorities			
		EVALUATION E	3Y RAPPORTEUR MEMBER	STATE		
Date		October 2004.				
Comm	ients	Field 4.3.3: In the laboratory studies this was achieved following fumigation at 25 and 30°C at dosages of <u>1420 g-h/m³</u> and <u>1426 g-h/m³</u> , respectively.				
		Field 5.2: A reliability indicator of 3 is suggested due to very brief reporting in study report, no statistical methods description, one study was not replicated, it was stated that further research was needed to verify the results.				
		Field 5.3: Sulfuryl fluoride achieved complete eradication of pine wood nematodes in the laboratory chambers following fumigation at 25 and 30°C at dosages of 1420 g-h/m^3 and 1426 g-h/m^3 , respectively.				
Summ	ary and conclusion	Applicant's summa	ary and conclusion is adopted.			

Criteria	Datails
Cincina	Details
Species	Bursaphelenchus xylophilus.
Source	Two Laboratory studies Shortleaf pine, <i>Pinus echinata</i> , naturally infested with the pine wood nematode cut into sticks of 2.5 x 2.5 x 2.5 cm were used. <u>Field fumigation</u>
	Logs of salvaged shortleaf pines that has been killed by the southern pine beetle, <i>Dendroctonus frontalis</i> , in 2002 and subsequently colonised by pine sawyers and pine wood nematode. The slabs from the logs, which were sawn into 96.5 cm lengths, were recovered during the milling process. The boards were 2.5 x 15 x 96.5 cm and 5 x 12.7 x 96.5 cm. The cants were 12.7 x 12.7 x 96.5 cm.
Life stage	Not available from report.
Mixed age population	Not available from report.
Number of nematodes in test	Not available from report.

1.1	Test organism –	Pine	wood	nematode
-----	-----------------	------	------	----------

1.2 Test system

Criteria	Details
Test chamber	Two laboratory studies
	Laboratory fumigation chambers, 0.028 m ³ in volume.
	Field fumigation
	Temporary fumigation chambers of $5m^3$ volume were constructed of lumber and covered with 6 mil polyethylene sheeting. The chambers were on a concrete pad and the edges sealed with wet sand prior to fumigation.
Number of chambers	Two laboratory studies
	First study: 4
	Second study: 1
	Field fumigation
	9 chambers.
Test insects introduction into chamber	First laboratory study
	Each of four fumigation chambers was loaded with 20 of the naturally infested with pine wood nematode shortfleaf pine sticks.
	Second laboratory study
	The chamber was loaded with 25 shortleaf pine sticks naturally infested with pine wood nematode.
	Field fumigation
	Each chamber load consisted of 13 pieces of each of

	the three lumber sizes and 24 slabs of shortleaf pine naturally infested with pine wood nematode.
Measuring equipment	Gas concentrations during fumigation were monitored with a Fumiscope, thermal conductivity meter. In the field fumigation ambient air temperature was recorded using Hobo data loggers.

Criteria	Details		
Application procedure	Laboratory studies		
	Not available from report.		
	Field fumigation		
	Not available from report.		
Delivery method	Laboratory studies		
	Not available from report.		
	Field fumigation		
	The introduction of sulfuryl fluoride into the chambers was controlled by a digital electronic scale.		
Dosage rate	First laboratory study		
	Fumigation exposure period was 24 hours. Concentrations were 30 and 60 g/m^3 .		
	Second laboratory study		
	Fumigation exposure period was 24 hours. Concentration was 60 g/m^3 .		
	Field fumigation		
	Fumigation exposure period 7.5 hours. Accumulated concentration x time (CT) range = $997 - 1751$ g-h/m ³ .		

1.3 Application of test substance

1.4 Test conditions

Criteria	Details
Substrate	Shortleaf pine Pinus echinata.
Incubation temperature	First laboratory study temperature was 20°C.
	Second laboratory study two temperatures were tested, 25 and 30°C.
	In the field fumigation the mean and maximum temperatures for the chambers during fumigation averaged 35.3 and 40.9°C respectively.
Moisture	Laboratory studies
	Not available from report.
	Field fumigation
	Mean wood moisture content expressed on a dry weight basis ranged from $32 - 37\%$.

Dow AgroSciences RMS: Sweden		April 2004 Vikane I	Ooc III-B5				
Section B5.10.2		Efficacy Data					
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/07 House longhorn beetle, European house borer, old house borer (Hylotrupes bajulus) Powder post beetle (Lyctus brunneus) Laboratory studies (Ref. Z7)					
1.1	Reference	1 REFERENCE: Z7, B5.10.2/07 Verheven, H. (2002)	Official use only				
		Fachhochschule. Eberswalde. Germany.					
		Investigatory studies on the ovicidal effect of a fumigant on dry woo insect pests.	od				
		Student Research Project.					
1.2	Data protection	Yes.					
1.2.1	Data owner	Dow AgroSciences LLC.					
1.2.2	Companies with letter of Access	Not relevant.					
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I.					
1.3	Guideline study	The studies were undertaken on the basis of sound principles of fumigation practice. The treatments were replicated to enable confidence in the results to be achieved.					
1.4	Deviations	Not applicable as the study was not conducted to an international standard method.					
		2 METHOD					
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.					
2.1.1	Trade name/ proposed trade name	Vikane.					
2.1.2	Composition of Product tested	\geq 99.8% Sulfuryl fluoride.					
2.1.3	Physical state and nature	Fumigant.					
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.					
2.1.5	Method of analysis	Not applicable.					
2.2	Reference substance	No reference substance was included in the study.					
2.2.1	Method of analysis for reference substance	Not applicable.					
2.3	Testing procedure						

Dow AgroSciences RMS: Sweden		April 200)4	Vi	kane		Doc I	II-B5
Section B5.10.2		Efficacy Data						
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/07 House longhorn beetle, European house borer, old house borer (Hylotrupes bajulus) Powder post beetle (Lyctus brunneus) Laboratory studies (Ref. Z7)						
2.3.1	Test population / inoculum / test organism	See Table	See Table 1.1.					
2.3.2	Test system	See Table	1.2.					
2.3.3	Application of test substance	See Table	1.3.					
2.3.4	Test conditions	See Table	1.4.					
2.3.5	Exposure time	Hylotrupe	s bajulus					
		22 hours a	nd 29 minu	tes – 168	hours and 30 r	ninutes.		
		Lyctus bru	inneus					
		8 hours an	d 48 minute	es – 26 ho	urs and 30 mir	nutes.		
2.3.6	Number of replicates performed	For each te different e time was r	For each test insect species a range of concentrations were tested with different exposure times. For <i>H. bajulus</i> the same concentration and time was replicated $1 - 4$ times and for <i>L. brunneus</i> $1 - 8$ times.					
2.3.7	Controls	Three controls were included for <i>H. bajulus</i> and two for for <i>L. brunneus</i> . Larvae emerging from the controls were maintained for a period of 4 weeks on wood material to confirm their viability to produce a new generation of beetles						
2.4	Examination							
2.4.1	Effect investigated	Mortality following	Mortality of eggs of different ages of <i>H. bajulus</i> and <i>L. brunneus</i> following exposure to sulfuryl fluoride.					
2.4.2	Method for recording	Examinati	Examination for egg hatch after fumigation.					
2.4.3	Intervals of examination	Mortality	Mortality was determined 1 – 4 days after exposure to sulfuryl fluoride.					
2.4.4	Statistics	Not available from report.						
2.4.5	Post fumigation monitoring	The total mortality effect of sulfuryl fluoride on <i>H. bajulus</i> and <i>L. brunneus</i> was determined after fumigation.						
		3 RESULTS						
3.1	Efficacy	Hylotrupes bajulus						
		The mortality results of <i>H. bajulus</i> following exposure to sulfuryl fluoride as shown below.						
		Percentage mortality of eggs of <i>Hylotrupes bajulus</i> following exposure to sulfuryl fluoride at 22°C						
		Egg Age	Egg No.	Con ⁿ	Ex. Time	Dosage (CT)	Mortality	
		Days g/m ³ Hours:min g-h/m ³						
		1 30 33.1 26:29 875 13.5						

Dow AgroSciences RMS: Sweden	April 20	04	Vi	kane		Doc 1	II-B5
Section B5.10.2	Efficacy	v Data					
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/07 House longhorn beetle, European house borer, old house borer (Hylotrupes bajulus) Powder post beetle (Lyctus brunneus) Laboratory studies (Ref. Z7)						
	1	15	66.3	26:25	1752	80.0	
	1	39	11.6	168:15	1954	53.2	
	1	8	13.6	169:22	2309	92.9	
	1	36	13.6	169:23	2309	98.5	
	1	19	132.8	18:12	2416	100.0	
	1	33	132.8	18:14	2416	66.7	
	1	24	16.5	168:30	2779	99.1	
	2	26	66.3	26:28	1752	100.0	
	2	4	97.9	26:18	2575	100.0	
	2	31	97.9	26:23	2575	100.0	
	3	11	33.1	26:28	875	1.3	
	3	23	66.3	26:27	1752	93.3	
	3	5	97.9	26:19	2575	40.0	
	3	18	97.9	26:21	2575	100.0	
	4	2	33.1	26:26	875	8.1	
	4	21	66.3	26:26	1752	1.2	
	4	20	132.8	18:13	2416	8.1	
	4	14	97.9	26:20	2575	39.7	
	4	6	174.5	18:07	3162	100.0	
	1				Untreated	3.1	
	1				Untreated	10.0	
	4				Untreated	18.8	

Lyctus brunneus

The mortality results of *L. brunneus* following exposure to sulfuryl fluoride as shown below.

Percentage mortality of eggs of <i>Lyctus brunneus</i>	following exposure
to sulfuryl fluoride at 22°C	

Egg Age	Egg No.	Con ⁿ	Ex. Time	Dosage (CT)	Mortality
Days		g/m ³	Hours:min	g-h/m ³	
1	19	11.5	44:39	512	100.0
1	39	11.5	44:39	512	100.0
1	11	28.9	19:40	568	100.0
1	38	28.9	19:40	568	100.0

Dow A RMS:	AgroSciences Sweden	April 2004		Vil	kane		Doc I	II-B5
Sectio	on B5.10.2	Efficacy I	Data					
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/07 House longhorn beetle, European house borer, old house borer (Hylotrupes bajulus) Powder post beetle (Lyctus brunneus) Laboratory studies (Ref. Z7)						
		1	21	24.5	26:30	650	100.0	
		1	33	24.5	26:30	650	100.0	
		1	43	24.5	26:30	650	100.0	
		2	20	28.9	19:40	568	100.0	
		2	27	24.5	26:30	650	100.0	
		3	8	36.3	08:48	320	100.0	
		3	22	28.9	19:40	568	100.0	
		3	29	28.9	19:40	568	100.0	
		3	1	24.5	26:30	650	100.0	
		4	12	28.9	19:40	568	100.0	
		4	13	28.9	19:40	568	100.0	
		4	26	24.5	26:30	650	100.0	
		5	2	32.6	11:50	385	100.0	
		5	5	32.6	11:50	385	100.0	
		5	3	24.4	19:22	472	100.0	
		5	7	28.9	19:40	568	100.0	
		5	10	24.5	26:30	650	100.0	
		2				Untreated	100.0	
		5				Untreated	100.0	
3.1.1	Dose/Efficacy curve	The mortality results for <i>H. bajulus</i> eggs following exposure to sulfuryl fluoride at 22°C at different dosages were variable and it is was not possible for a dose response to be established. A high level of mortality of <i>L. brunneus</i> eggs in the untreated was recorded and again it was not possible for a dose response to be established.						
3.1.2	Begin and duration of effects	Assessment was completed $1 - 4$ days after exposure to sulfuryl fluoride.						
3.1.3	Observed effects in the post monitoring phase	No unusual o	effect obs	erved.				
3.2	Effects against organisms or objects to be protected	None reporte	ed.					
3.3	Other effects	None reporte	ed.					
3.4	Efficacy of the reference substance	No reference	e substanc	e was used	l.			

Dow AgroSciences RMS: Sweden		April 2004 Vikane Do			
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/07 House longhorn beetle, European house borer, old house borer (Hylotrupes bajulus) Powder post beetle (Lyctus brunneus) Laboratory studies (Ref. Z7)			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED 7 FIELD CONDITIONS	Ю		
4.1	Reasons for laboratory testing	1. Practical, accurate procedure.			
		2. Different dosages could be tested.			
4.2	Intended actual scale of biocide application	In structures and wooden material infested with the beetles.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentrat sufficient period of time to enable a toxic dose to be received b target pest. There are a number of ways in laboratory and field to achieve this although the principle is the same.	tion for a y the studies		
4.3.2	Test organism	Hylotrupes bajulus and Lyctus brunneus eggs used in the study produced after understanding the natural behaviour of the insec	ts.		
4.3.3	Observed effect	The desired result through fumigation of <i>Hylotrupes bajulus</i> an <i>brunneus</i> with sulfuryl fluoride is to achieve 100% control, i.e., eradication. Some dosages achieved this result.	d Lyctus		
4.4	Relevance for read-across	The results achieved were not considered to be relevant to read other insect species.	across to		
		5 APPLICANT'S SUMMARY AND CONCLUSION			
5.1	Materials and methods	A series of laboratory chamber fumigations with sulfuryl fluori 22°C were undertaken to determine the dosage required to kill of different ages of <i>Hyloptrupes bajulus</i> and <i>Lyctus brunneus</i> . In tests different concentrations and exposure times were used to of the dosage (Ctp, concentration x time product) range. Mortality assessments were undertaken 4 days after fumigation.	de at eggs of these establish y		
5.2	Reliability	Reliability indicator 2: Study conducted in accordance with ger accepted scientific principles, possibly with incomplete reportin methodological deficiencies, which do not affect the quality of	nerally ng or relevant		

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Section B5.10.2		Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/07 Hou borer, old hou Powder post b Laboratory st	use longhorn beetle, Europ se borer (Hy <i>lotrupes bajuli</i> eetle (<i>Lyctus brunneus</i>) tudies (Ref. Z7)	ean house us)
		results.		
5.3	Assessment of efficacy, data analysis and interpretation	High or complete some of the dosag However there wa indicated that eggs compared with you is not possible to e of <i>Lyctus brunneu</i> therefore it is not p data.	mortality was achieved for <i>Hylotra</i> es tested e.g. 1752, 2416, 2575 316 is a lack of consistency in the resul s of 4 days old were less sensitive a unger eggs. In view of the variabi establish a dose response for this pa- s was recorded in the untreated con possible to make any meaningful in	<i>upes bajulus</i> at 62 g-h/m ³ . ts. The data to sulfuryl fluoride lity in the data set it est. High mortality ntrols and it nterpretation of the
5.4	Conclusion	No dose response following fumigat fumigation at high Further work is ne method of produci remain viable.	could be established for eggs of H_1 ion with sulfuryl fluoride at 22°C. her temperatures would enable this eded on <i>Lyctus brunneus</i> to enable ing eggs to enable those in the untr	ylotrupes bajulus It is suggested that to be achieved. e a more reliable reated controls to
5.5	Proposed efficacy specification	Proposed efficacy	specification not proposed from the	iis study.
		Evaluation by	Competent Authorities	

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	No comments.
Summary and conclusion	Applicant's summary and conclusion is adopted.
Criteria	Details
----------	--
Family	House long horn beetle – Cerambycidae
	Powder post beetle – Lycidae
Species	House long horn beetle (also known as old house borer) – <i>Hylotrupes bajulus</i>
	Powder post beetle – Lyctus brunneus
Source	Hylotrupes bajulus eggs
	The male and female beetles were placed together into a Petri dish lined with filter paper, mating commenced immediately. Two to 3 hours later the male beetle was removed. Oviposition (egg laying) commenced within the next 24 – 48 hours.
	Lyctus brunneus eggs
	Two methods to produce eggs were evaluated.
	Method 1
	A successful oviposition was achieved on oak sapwood specimens, <i>Quercus petraea</i> , in dimensions of 15 mm x 50 mm x 25 mm. The cross-cut ends of the sapwood specimens were dipped in paraffin in order to seal the vessels, thereby forcing the beetles to deposit their eggs on the surface. The wood specimens were placed in a dish lined with filter paper, onto which approx. 30 male and female <i>Lyctus</i> <i>brunneus</i> beetles were dropped. The female <i>Lyctus</i> beetles used their ovipositor to lay their eggs in the gap between the wood specimen and the filter paper. The subsequent continuous inspection of the specimens had to be conducted with great care, as the necessity to check the eggs deposited underneath the specimens proved somewhat difficult.
	<u>Method 2</u> The wood specimen tested was English holly, <i>Ilex aquifolium</i> . This specimen had the same dimensions as the previous one. In this wood type, the vessels at the cross-cut ends, being extremely small, did not present a problem. The same number of beetles was deposited on the specimen. Here again, <i>Lyctus brunneus</i> laid its eggs in the gap between the wood specimen and the filter paper.
	<u>Comparison of the methods</u> The only difference was in the number of eggs deposited on the individual holly wood specimens. This is attributed to the wood itself, which had been stored in different conditions and thus featured surface discolorations, which were probably responsible for the differences in the egg-laying behavior of the beetles as they fed across the surface. The adult beetles laid fewer eggs on wood that had not been encased during storage, and was subsequently slightly darker in colour as a result of

1.1	Test organisms -	House Longhorn bee	etle, pov	wder post beetle

Dow AgroSciences April 2004 RMS: Sweden	Vikane	Doc III-B5
	 being exposed to daylight, than on been stored in a dark, air-conditioned darker wood specimens, the egg bat 10 to 15 eggs. On wood that had be conditioned locations, the batches ran 30 eggs. On both specimens, the eggs were porthe edge and did not extend very far This is explained by the short length of the <i>Lyctus brunneus</i> female beetles. 	wood that had d location. On ches comprised en stored in air- nged from 20 to sitioned close to into the crevice. of the ovipositor
	holly wood specimens positioned or Petri dishes and comprising 30 beetles	a filter paper in per sample.
Life stage	Eggs.	
Mixed age population	Eggs aged $1 - 5$ days old.	
Total number of eggs in test	Hylotrupes bajulus	
	Eggs Age (days) Number	
	1 521	
	2 120	
	3 119	
	4 519	
	Lyctus brunneus	
	Eggs Age (days) Number	
	1 139	
	2 48	
	3 75	
	$\frac{4}{5}$ $\frac{43}{215}$	

1.2 Test system

Criteria	Details
Test chamber	Fumigation boxes consisting of small plastic containers. Each box was fitted with two plastic tubes in the lid designed to provide a connection to the ambient air or other media.
Number of chambers	Thirteen.
Test insects introduction into chamber	Eggs were introduced into the chambers on Petri dishes lined with filter paper.
Measuring equipment	Concentration of sulfuryl fluoride was measured with a Fumiscope thermal conductivity detector.

1.3 Application of test substance

Criteria	Details
Application procedure	Not available from report.
Delivery method	Sulfuryl fluoride was injected into each box via one of the tubes fitted to the lid.
Dosage rate	Hylotrupes bajulus
	875 - 3162 CT (concentration x time) g-h/m ³
	Lyctus brunneus
	512 - 650 Ctp (concentration x time product) g-h/m ³

Criteria	Details
Substrate	Filter paper.
Incubation temperature	22°C.
Moisture	44% relative humidity.

Dow A RMS:	AgroSciences Sweden	April 20	04 Vikane 1	Doc III-B5
Sectio	m R5 10 2	Ffficeo	v Data	
Sectio	n D5.10.2	Efficacy	Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2 borer, o Labora	/08 House longhorn beetle, European house old house borer (Hy <i>lotrupes bajulus</i>) tory studies (Ref. Z8)	
		1 1	DEFEDENCE, 78 B5 10 2/08	Official use only
11	Reference	Ducom P	P Roussel C and Stefanini V (2003)	use only
1.1	hererence	Laboratoi Techniqu Chemin d	re National de la Protection des Végétaux, Station d'Etude es de fumigation et de Protection des Denrées Stockées, l'Artigues -33150 Cenon, France.	e des
		Efficacy o <i>bajulus</i> (I	of sulfuryl fluoride on European house borer eggs, <i>Hylotri</i>) (Coleoptera: Cerambycida).	pes
		Contract	research project.	
1.2	Data protection	Yes.		
1.2.1	Data owner	Dow Agr	oSciences LLC.	
1.2.2	Companies with letter of Access	Not releva	ant.	
1.2.3	Criteria for data protection	Data subr purpose o	nitted to the MS after 13 May 2000 on existing b.p. for the f its entry into Annex I	·
1.3	Guideline study	The studion fumigation	es were undertaken on the basis of sound principles of n practice.	
1.4	Deviations	Not applies standard 1	cable as the study was not conducted to an international nethod.	
		2 N	метнор	
2.1	Test Substance (Biocidal Product)	Sulfuryl f	luoride	
2.1.1	Trade name/ proposed trade name	Vikane.		
2.1.2	Composition of Product tested	\geq 99.8% S	Sulfuryl fluoride.	
2.1.3	Physical state and nature	Fumigant		
2.1.4	Monitoring of active substance concentration	Monitorir	ng was undertaken using a gas chromatograph.	
2.1.5	Method of analysis	Not appli	cable.	
2.2	Reference substance	No refere	nce substance was included in the study.	
2.2.1	Method of analysis for reference substance	Not appli	cable.	
2.3	Testing procedure			

Dow A	AgroSciences : Sweden	April 2004		Vika	ine		Doc 1	III-B5
Sectio	on B5.10.2	Efficacy I	Data					
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6B5.10.2/08 House longhorn beetle, European house borer, old house borer (Hylotrupes bajulus) 					ouse			
2.3.1	Test population / inoculum / test organism	See Table 1.	1.					
2.3.2	Test system	See Table 1.	2.					
2.3.3	Application of test substance	See Table 1.	3.					
2.3.4	Test conditions	See Table 1.	4.					
2.3.5	Exposure time	24 and 48 ho	ours.					
2.3.6	Number of replicates performed	Dose range of at 20 and 25	developed °C.	for 24 and 4	48 hour exposu	re to sulfu	ryl fluoride	Х
2.3.7	Controls	One or two of for each egg	controls we	ere included	for each dose	response d	letermined	
2.4	Examination							
2.4.1	Effect investigated	Mortality of exposure to	eggs of di sulfuryl flu	fferent ages 10ride.	Hylotrupes baj	<i>iulus</i> follo	wing	
2.4.2	Method for recording	Examination	n for egg m	nortality afte	er fumigation.			
2.4.3	Intervals of examination	Not availabl	e from rep	ort.				
2.4.4	Statistics	Data was and	alysed usin	ng probit an	alysis.			
2.4.5	Post fumigation monitoring	The total mo eggs was det	ortality effe termined a	ect of sulfur fter fumigat	yl fluoride on <i>H</i> ion.	lylotrupes	. bajulus	
		3 RE	SULTS					
3.1	Efficacy	Temperature	e 20°C, one	e day old eg	<u>gs</u>			
		With a dosag mortality of 48 hours cor achieved wit 1200 g-h/m ³	ge (Ctp con <i>Hylotrupe</i> npared wit th each exp	ncentration s <i>bajulus</i> eg th 24 hours. posure time	x time product) gs was higher f However, 100 for one day old	of 800 g- for an expo % mortali eggs at a	h/m ³ the osure time of ty is dosage of	
		Percenta following e	ige mortal exposure t	lity of one d o sulfuryl f	lay old eggs of luoride for 24	<i>Hylotrupe</i> and 48 ho	es <i>bajulus</i> ours at 20°C	
		24	Hour Exp	osure	48 Hoi	ır Exposu	re	
		Dosage CT	Egg No.	% Kill	Dosage CT	Egg No,	% Kill	
		g-h/m ³			g-h/m ³			
		Untreated	56	7.14	Untreated	57	10.53	
		Untreated	59	11.86	Untreated	59 57	3.39	
		579 781	51 50	19.01 27.12	419 766	51 58	10.53 79.31	
		/01	لول	41.14	/00	50	17.51	

Dow AgroSciences RMS: Sweden	April 20	04	Vik	ane		Ι	Doc III-B5
Section B5.10.2	Efficacy	v Data					
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2 borer, o Labora	/08 House ld house tory stuc	e longhori borer (Hy lies (Ref. 2	n beetle, E blotrupes b Z8)	uropean l ajulus)	house	
	793	54	35.19	788	59	91.38	
	1226	60	100	1242	59	100	
	1234	50	96	1247	60	100	
	1635	60	100	1600	59	100	

100

Temperature 20°C, two day old eggs

55

1637

The length of exposure time, 24 and 48 hours did not influence the efficacy of sulfuryl fluoride on two day old eggs. A dosage (CT) of 1200 g-h/m^3 provided complete mortality of two day old eggs for each exposure time.

1621

59

100

Percentage mortality of two	day old eggs of Hylotrupes bajulus
following exposure to sulfuryl	fluoride for 24 and 48 hours at 20°C

24 Hour Exposure			48 Hour Exposure			
Dosage CT	Egg No.	% Kill	Dosage CT	% Kill		
g-h/m ³			g-h/m ³			
Untreated	55	0	Untreated	59	8.5	
387	53	18.9	421	60	21.7	
449	53	41.5	448	59	16.9	
790	51	76.5	812	61	70.5	
1256	55	100	846	57	73.7	
1658	54	100	1251	62	88.7	
			1299	58	100	
			1627	60	100	

Temperature 20°C, three day old eggs

The length of exposure time, 24 and 48 hours did not influence the efficacy of sulfuryl fluoride on three day old eggs. A dosage (CT) of 1600 g-h/m^3 provided complete mortality of three day old eggs for each exposure time.

Percentage mortality of three day old eggs of *Hylotrupes bajulus* following exposure to sulfuryl fluoride for 24 and 48 hours at 20°C

24	Hour Expo	osure	48 Hour Exposure			
Dosage CT	Egg No.	% Kill	Dosage CT	Egg No,	% Kill	
g-h/m ³			g-h/m ³			
Untreated	53	11.3	Untreated	59	3.4	

Dow AgroSciences RMS: Sweden	April 2004		Vik	ane			Doc III-B5
Section B5.10.2	Efficacy l	Data					
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/0 borer, old Laborato	8 House l house ry stud	e longhor borer (Hy lies (Ref.)	n beetle, Eur vlotrupes baji Z8)	opean l <i>ulus</i>)	house	
	Untreated	54	5.6	Untreated	56	8.9	
	387	56	26.8	371	56	10.7	
	789	55	65.5	756	55	49.1	
	1220	55	87.3	844	57	52.6	
	1574	55	100	1155	57	68.4	
	1614	57	100	1190	54	72.2	

Temperature 20°C, five day old eggs

The length of exposure time, 24 and 48 hours did not influence the efficacy of sulfuryl fluoride on five day old eggs. A dosage (CT) of 1600 g-h/m^3 provided complete mortality of five day old eggs for each exposure time.

1551

1581

55

57

100

100

Percentage mortality of five day old eggs of *Hylotrupes bajulus* following exposure to sulfuryl fluoride for 24 and 48 hours at 20°C

24 Hour Exposure			48 Hou	48 Hour Exposure		
Dosage CT	Egg No.	% Kill	Dosage CT	Egg No,	% Kill	
g-h/m ³			g-h/m ³			
Untreated	55	5.3	Untreated	54	3.7	
394	59	11.9	Untreated	54	1.9	
770	58	27.6	Untreated	59	3.4	
836	54	31.5	407	61	31.3	
1237	60	93.3	755	57	33.3	
1243	56	98.2	1229	57	84.2	
1662	56	100	1732	60	100	

Temperature 25°C, two day old eggs

At 25° C the length of exposure time, 24 and 48 hours did not influence the efficacy of sulfuryl fluoride on two day old eggs. A dosage (CT) of 1200 g-h/m³ provided complete mortality of two day old eggs for each exposure time.

Percentage mortality of two day old eggs of *Hylotrupes bajulus* following exposure to sulfuryl fluoride for 24 and 48 hours at 25°C

24 Hour Exposure			48 Hour Exposure		
Dosage CT	Egg No.	% Kill	Dosage CT	Egg No,	% Kill
g-h/m ³			g-h/m ³		

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5

Section B5.10.2	Efficacy Data
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Annex Point IIB5.10	B5.10.2/08 House longhorn beetle, European house
TNsG: Pt. I-B5.10, Pt. III-Ch. 6	borer, old house borer (Hylotrupes bajulus)
	Laboratory studies (Rel. 28)

Untreated	59	10.2	Untreated	57	3.5	
198	52	3.9	Untreated	59	17.6	
397	59	15.3	252	58	10.3	
596	52	5.8	582	56	16.1	
787	54	40.7	782	53	15.7	
1222	60	100	1191	51	92.2	
1612	61	100	1207	55	100	
			1534	53	100	

Temperature 25°C, five day old eggs

At 25°C the 24 hour exposure time seems to be less effective than the 48 hour exposure time since the dosage achieving complete mortality is 1200 g-h/m³ and 750 g-h/m³ respectively.

Percentage mortality of five day old eggs of *Hylotrupes bajulus* following exposure to sulfuryl fluoride for 24 and 48 hours at 25°C

24 Hour Exposure			48 Hour Exposure		
Dosage CT	Egg No.	% Kill	Dosage CT	Egg No,	% Kill
g-h/m ³			g-h/m ³		
Untreated	56	3.6	Untreated	54	1.6
Untreated	56	10.7	Untreated	60	5.0
241	56	21.4	Untreated	55	7.3
459	55	29.1	134	56	16.1
740	60	26.7	309	55	9.1
991	54	27.8	440	56	16.1
1234	54	100	464	58	12.1
			592	57	43.9
			754	57	100

Statistical analysis

Comparison of calculated dosage giving 99% mortality (using probit analysis) with dosage observed giving 100% mortality

Х

Freatment ¹ Dosage (CT)		Dosage (CT)
	Calculated	Observed
20°C, d+1, 24h	1285	1200
20°C, d+2, 24h	1379	1200
20°C, d+3, 24h	1927	1600
20°C, d+5, 24h	1402	1600

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc 1	III-B5	
Sectio	on B5.10.2	Efficacy Data				
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/08 House longhorn beetle, European house borer, old house borer (Hylotrupes bajulus) Laboratory studies (Ref. Z8)				
		20°C. d+1. 48h	1214	1200		
		20°C, d+2, 48h	1661	1200		
		20°C, d+3, 48h	2098	1600		
		20°C, d+5, 48h	2755	1600		
		25°C, d+2, 48h	886	1200	x	
		25°C, d+2, 48h	1203	1200	Λ	
		25°C, d+5, 48h	5388	1600		
		25°C, d+5, 48h	678	1600		
3.1.1	Dose/Efficacy curve	Different levels of su <i>Hylotrupes bajulus</i> e the 3 day old eggs we calculated that 50% r follows:	sceptibility to sulfuryl fluc ggs. For examples at 20°C ere the most tolerant. Usin nortality of each egg age w	oride were apparent in and 24 hours exposure g probit analysis it was yould be achieved at		
		Temperature 20°C, 2	4 hours exposure			
		Egg Age (days)	Dosage Needed for 50)%		
			Mortality g-h/m ³			
		1	883			
		2	531			
		3	633			
		5	907			
		Temperature 20°C, 4	8 hours exposure			
		Egg Age (days)	Dosage Needed for 50)%		
			Mortality g-h/m ³			
		1	507			
		2	686			
		3	850			
		5	710			
3.1.2	Begin and duration of effects	Not available from re	eport.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect ob	served.			
3.2	Effects against	None reported.				

Dow A RMS:	AgroSciences : Sweden	April 2004 Vikane I	Doc III-B5		
Sectio	on B5.10.2	Efficacy Data			
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/08 House longhorn beetle, European house borer, old house borer (Hylotrupes bajulus) Laboratory studies (Ref. Z8)			
	organisms or objects to be protected				
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1. Practical, accurate procedure.			
	laboratory testing	2. Different dosages could be tested.			
4.2	Intended actual scale of biocide application	In structures and wooden material infested with the beetles.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration f sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field stud to achieve this although the principle is the same.	for a lies		
4.3.2	Test organism	Hylotrupes bajulus eggs used in the study.			
4.3.3	Observed effect	The desired result through fumigation of <i>Hylotrupes bajulus</i> is to achieve 100% control, i.e., eradication. Using a range of dosages it possible to establish dosages which achieved this result.	was		
4.4	Relevance for read-across	The results achieved were not considered to be relevant to read acro other insect species.	ss to		
		5 APPLICANT'S SUMMARY AND CONCLUSION			
5.1	Materials and methods	A series of laboratory chamber fumigations with sulfuryl fluoride at and 25°C were undertaken to determine the dosage required to kill e of different ages of <i>Hyloptrupes bajulus</i> . In these tests different concentrations and exposure times of 24 and 48 hours were used to	aggs X		

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 9 Pt. I-B5.10, -Ch. 6	B5.10.2/08 Hou borer, old hous Laboratory stu	use longhorn beetle, Europ se borer (Hy <i>lotrupes bajul</i> udies (Ref. Z8)	pean house us)
		establish the dosag	e (Ctp, concentration x time pro-	duct) range.
5.2	Reliability	Reliability indicato accepted scientific methodological det results.	r 2: Study conducted in accorda principles, possibly with incomp ficiencies, which do not affect th	nce with generally blete reporting or e quality of relevant
5.3	Assessment of efficacy, data	High or complete n some of the dosage	nortality was achieved for <i>Hylot</i> es tested	<i>rupes bajulus</i> at
	analysis and interpretation	The data indicated susceptibility to su day old eggs appea 2500 g-h/m ³ would view of the heterog significant results t time in the dosage	that the age of the eggs affected lfuryl fluoride. At 20°C and 24 l red to be the least susceptible. A l provide complete mortality for geneous data it was not possible to define the relative importance or the influence of increasing the	their level of hours exposure three At 20°C a dosage of eggs of all ages. In to obtain statistical of concentration and e temperature.
5.4	Conclusion	At 20°C and 24 hot g-h/m ³ will achieve ages.	urs exposure sulfuryl fluroride a e complete mortality of <i>Hylotrup</i>	dosage (CT) of 2500 bes bajulus eggs of all
5.5	Proposed efficacy specification	Complete mortality infested material.	(eradication) of Hylotrupes baj	ulus eggs from wood

	Evaluation	by Comp	etent Authorities			
	EVALUATION BY RAPPORTEUR MEMBER STATE					
Date	October 2004.					
Comments	The text in field 2.3.6 is wrong and should read: 50-61 eggs were included in each treatment.					
	Field 3.1: Tab <i>bajulus</i> follow two last lines (Field 3.1: Table headed 'Percentage mortality of five day old eggs of <i>Hylotruptes bajulus</i> following exposure to sulfuryl fluoride for 24 and 48 hours at 25 °C' the two last lines (for 48h exposure) are missing, they should read:				
	Dosage CT	Dosage CT Egg No % Kill				
	1164	1164 57 100				
	1435	52	100			
	Table headed 'Comparison of calculated dosage giving 99% mortality (using probit analysis) with dosage observed giving 100% mortality' contains some misprints, the last section should read:					
	Treatment Dosage (CT) Dosage (CT)					
			Calculated	Observed		
	25 °C, d+2, <u>2</u>	<u>24h</u>	886	1200		
	25 °C, d+2, 4	48h	1203	1200		
	25 °C, d+5, <u>2</u>	<u>24h</u>	5388	<u>1200</u>		
	25 °C, d+5, 48h 678 <u>750</u>					
	Field 5.1 The temperature given in the first line should be 20 °C (not 2°C)					
Summary and conclusion	Applicant's ve	ersion is adop	oted.			

1.1 Test organisms - House Longhorn beete					
Criteria	Details				
Family	Cerambycidae.				
Species	House long horn beetle (also known as European house borer and old house borer) – <i>Hylotrupes bajulus</i> .				
Source	Laboratory reared.				
Life stage	Eggs.				
Mixed age population	Eggs aged 1, 2, 3 and 5 days old.				
Total number of eggs in test	Test temperature 20°C				
	Eggs Age (days) Exposure period (hours)				
	24 48				
	Egg number				
	1 504 527				

1.1 Test organisms - House Longho	orn beetle
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Dow AgroSciences RMS: Sweden	April 2004	Vikane		Doc III-B
		2	321	476
		3	385	506
		5	400	402
		Test temperature 25°	<u>C</u>	
		Eggs Age (days)	Exposure pe	eriod (hours)
			24	48
			Egg r	number
		2	397	442
		5	391	618

1.2 Test system

Criteria	Details
Test chamber	Glass jar, one litre in volume maintained in a climate control cabinet.
Number of chambers	Eleven.
Test insects introduction into chamber	Eggs were introduced into the chambers on filter paper.
Measuring equipment	Concentration of sulfuryl fluoride was measured with a gas chromatograph.

1.3 Application of test substance

Criteria	Details
Application procedure	Syringe.
Delivery method	Sulfuryl fluoride was injected into glass jar using a 60 or 140 ml syringe. It was then homogenized with a stirrer.
Dosage rate	Ctp (concentration x time product) range $0 - 1658$ g-h/m ³ .

Criteria	Details
Substrate	Filter paper.
Incubation temperature	20°C and 25°C.
Moisture	Not available from report.

Dow A RMS:	bw AgroSciences April 2004 Vikane Do MS: Sweden		Doc III-B5		
Sectio	Section B5.10.2 Efficacy Data				
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6B5.10.2/09 Furniture carpet beetle (A Black carpet beetle (Attagenus megate Cigarette beetle (Lasioderma serricorn Hide beetle (Dermestes maculatus) Laboratory studies (Ref. Z9)		2/09 Furniture carpet beetle (Anthrenus flavig carpet beetle (Attagenus megatoma) tte beetle (Lasioderma serricorne) eetle (Dermestes maculatus) ttory studies (Ref. Z9)	pes)		
		1	REFERENCE: Z9, B5.10.2/09	Official use only	
1.1	Reference	Su, N-Y.	, and Scheffrahn, R.H. (1990).		
		Fort Lau Institute 33314, U	derdale Research and Education Centre, University of Flood and Agricultural Sciences, Fort Lauderdale, Flor SA.	orida, ida	
		Efficacy (Coleopt	of sulfuryl fluoride against four beetle pests of museums era: Dermestidae, Anobiidae).		
		Journal c	f Economic Entomology Volume 83, pages 879 – 882.		
1.2	Data protection	Not prote	ected.		
1.2.1	Data owner	Data in t	ne public domain in published paper.		
1.2.2	Companies with letter of Access	Not relevant.			
1.2.3	Criteria for data protection	No data protection claimed.			
1.3	Guideline study	The studies were undertaken on the basis of sound principles of fumigation practice. The experimental design enabled a robust statistical analysis to be undertaken to ensure high confidence in the data generated.		he	
1.4	Deviations	Not applicable as the study was not conducted to an international standard method.			
		2	METHOD		
2.1	Test Substance (Biocidal Product)	Sulfuryl	fluoride.		
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	99% Suli	furyl fluoride.		
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a gas chromatograph.			
2.1.5	Method of analysis	Not appl	cable.		
2.2	Reference substance	No refere	ence substance was included in the study.		
2.2.1	Method of analysis for reference	Not appl	cable.		

Dow A RMS:	Dow AgroSciences April 2004 Vikane Do RMS: Sweden		Doc III-B5	
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/09 Furniture carpet beetle (Anthrenus flavipes) Black carpet beetle (Attagenus megatoma) Cigarette beetle (Lasioderma serricorne) Hide beetle (Dermestes maculatus) Laboratory studies (Ref. Z9)		
	substance			
2.3	Testing procedure			
2.3.1	Test population / inoculum / test organism	See Table 1.1.		
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of test substance	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Exposure time	22 hours.		
2.3.6	Number of replicates performed	Fifteen to 20 insects included for each treatment.		
2.3.7	Controls	One control was included for life stage and species combination.		
2.4	Examination			
2.4.1	Effect investigated	Mortality of eggs, larvae and adults of <i>A. flavipes</i> , <i>A. megatoma</i> , <i>L. serricorne</i> , and <i>D. maculatus</i> .		
2.4.2	Method for recording	Mortality assessments after fumigation with sulfuryl fluoride.		
2.4.3	Intervals of examination	3 – 18 days after fumigation.		
2.4.4	Statistics	Data was analysed using probit analysis.		
2.4.5	Post fumigation monitoring	The total mortality effect of sulfuryl fluoride on eggs, larvae and ac of <i>A. flavipes</i> , <i>A. megatoma</i> , <i>L. serricorne</i> , and <i>D. maculatus</i> was determined after fumigation.	lults	
		3 RESULTS		
3.1	Efficacy	Except for <i>D. maculatus</i> adults were generally twice as susceptible sulfuryl as the larvae at LC_{50} . The egg stage is less susceptible to sulfuryl fluoride compared to the larval and adult stage. <i>A. flavipes A. megatoma</i> were generally more difficult to kill with sulfuryl fluoride compared with <i>L. serricorne</i> . <i>D. maculatus</i> was the most susceptible species. <i>A. megatoma</i> eggs were approximately twice as tolerant to sulfuryl fluoride as the egg stage of <i>A. flavipes</i> . However, <i>A. megatoma</i> adults and larvae were almost two times more susceptible than those <i>A. flavipes</i> .	to s and pride ble ble toma se of	

Dow AgroSciences	April 2004	Vikane	Doc III-B5		
RMS: Sweden	_				
Section B5.10.2	Efficacy Data				
Annex Point IIB5.10	B5.10.2/09 Fur	niture carpet beetle (Ant	hrenus flavipes)		
TNsG: Pt. I-B5.10,	Black carpet beetle (Attagenus megatoma)				
Pt. 111-Ch. 6	Cigarette beetle (Lasioderma serricorne)				
	Hide beetle (Dermestes maculatus)				
	Laboratory stu	ıdies (Ref. Z9)			

Efficacy of sulfuryl fluoride for the control of three life stages of								
	beetle pests							
Species ¹	Stag	e ² N	o ³ .	Slope	LC ₅₀	LC ₉₉	PFT ⁵	
					(95% CL ⁴)	(95% CL)		Х
A. fla.	Е	228	0.0	1 ± 0.01	15.97	38.80		
					(13.15 – 18.44)	(33.79 - 47.25)	18	
A. fla.	L	228	0.8	3 ± 0.13	4.30	7.11		
					(4.30 – 4.54)	(6.36 - 8.52)	8	
A. fla.	А	229	1.8	6 ± 0.28	2.30	3.55		
					(2.12 – 2.43)	(3.30 – 4.01)	6	
A. meg.	Е	164	0.0	$05 \pm 0.00^{\circ}$	7 29.93	77.00		
					(25.28 - 34.48)	(66.04 - 96.05)	18	
A. meg.	L	240	2.5	8 ± 0.45	2.19	3.09		
					(2.03 – 2.30)	(2.89 – 3.49)	2	
A. meg.	А	228	3 1.9	94 ± 0.24	0.79	1.98		
					(0.66 – 0.90)	(1.75 – 2.36)	4	
L. ser.	Е	231	0.1	5 ± 0.02	16.90	32.35		
					(15.11 – 18.50)	(29.20 – 37.37)	8-10	
L. ser.	L	240	3.2	8 ± 0.50	1.83	2.54		
					(1.73 – 1.90)	(2.40 - 2.79)	3	
L. ser.	А	240	3.2	7 ± 0.38	0.88	1.59		
					(0.81 – 0.94)	(1.46 – 1.79)	3	
D. mac.	Е	198	0.1	5 ± 0.02	19.12	34.93		
					(17.36 – 20.78)	(31.71 – 39.92)	5	
D. mac.	L	240	3.80	5 ± 0.47	0.67	1.27		
					(0.60 - 0.74)	(1.14 – 1.47)	6	
D. mac	А	228	3.76	5 ± 0.53	0.68	1.30		
					(0.59 – 0.77)	(1.14 – 1.60)	3	
¹ A. fla. = <i>Lasioder</i>	= Anth ma se	erenu. errico	s fla orne,	<i>vipes</i> , A. D. mac.	meg. = Attagenu = Dermestes mad	s megatoma, L. s culatus.	er. =	
$^{2}E - Eco$	т –	Lory	۰ ۸	$- \Lambda dult$				

²E = Egg, L = Larva, A = Adult.
³No. = Number of insects excluding control.

⁴LD = Lethal concentration, CL = Confidence limits.

Dow AgroSciences	April 2004	Vikane	Doc III-B5	
RMS: Sweden				
Section B5.10.2	Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6	B5.10.2/09 Furniture carpet beetle (Anthrenus flavipes) Black carpet beetle (Attagenus megatoma) Cigarette beetle (Lasioderma serricorne) Hide beetle (Dermestes maculatus) Laboratory studies (Ref. Z9)			

⁵PFT = Period after fumigation time in days when no further mortality for larvae and adults occurred or when no egg hatching was observed.

Dosage (CT, concentration x time) of sulfuryl fluoride required to achieve 50 and 99% control of three life stages of beetle pests at 26.5 \pm 0.5°C.

Species	Stage	Dosage (Dosage (CT) g-h/m ²	
		50%	99%	
Anthrenus flavipes	Egg	351.3	853.6	
	Larva	94.6	156.4	
	Adult	50.6	78.1	
Attagenus megatoma	Egg	658.5	1694.0	
	Larva	48.2	68.0	
	Adult	17.4	43.6	
Lasioderma serricorne	Egg	371.8	711.7	
	Larva	40.3	55.9	
	Adult	19.4	35.0	
Dermestes maculatus	Egg	420.6	768.5	
	Larva	14.7	27.9	
	Adult	15.0	28.6	

- 3.1.1 Dose/Efficacy curve
 3.1.2 Begin and duration of effects
 See Efficacy Results above for 50% and 99% control.
 Ranged from 3 18 days.
- 3.1.3 Observed effects in No unusual effect observed. the post monitoring phase
- 3.2 Effects against None reported. organisms or objects to be protected
- **3.3 Other effects** None reported.
- **3.4 Efficacy of the** No reference substance was used. reference substance
- **3.5 Tabular and/or** See 3.1. graphical presentation of the summarised

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5					
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/09 Furniture carpet beetle (<i>Anthrenus flavipes</i>) Black carpet beetle (<i>Attagenus megatoma</i>) Cigarette beetle (<i>Lasioderma serricorne</i>) Hide beetle (<i>Dermestes maculatus</i>) Laboratory studies (Ref. Z9)							
	results								
3.6	Efficacy limiting factors								
3.6.1	Occurrences of resistances	None reported.							
3.6.2	Other limiting factors	None reported.							
		4 RELEV FIELD	ANCE OF THE RESULTS COMPA	RED TO					
4.1	Reasons for	1. Practical, accurate procedure.							
	laboratory testing	2. Different dosages could be tested.							
4.2	Intended actual scale of biocide application	In structures and wooden material infested with the beetles. These beetle pests are of particular importance in museums.							
4.3	Relevance compared to field conditions								
4.3.1	Application method	The principle of f sufficient period target pest. There to achieve this alt	fumigation is to confine a sufficient cor of time to enable a toxic dose to be rece e are a number of ways in laboratory an though the principle is the same.	ncentration for a eived by the nd field studies					
4.3.2	Test organism	Furniture carpet b	peetle (Anthrenus flavipes)						
		Black carpet beet	ile (Attagenus megatoma)						
		Cigarette beetle (Lasioderma serricorne)						
		Hide beetle (Derr	mestes maculatus)						
4.3.3	Observed effect	The desired result through fumigation Anthrenus flavipes, Attagenu							
		<i>megatoma</i> , <i>Lasioderma serricorne</i> and <i>Dermestes maculatus</i> is to achieve 100% control, i.e., eradication. Using a range of dosages it was possible to establish dosages which achieved this result.							
4.4	Relevance for read-across	The results achieving insect species.	ved were considered to be relevant to o	ther beetle					
		5 APPLIC	CANT'S SUMMARY AND CONCLU	JSION					
5.1	Materials and methods	The efficacy of su Anthrenus flaving Dermestes macul adults $7 - 14$ day A. flavines, A. m Fifteen to 20 inse for exposure to 12 insects were expo at a range of cond	ulfuryl fluoride against eggs, larvae and es, Attagenus megatoma, Lasioderma se atus was determined. Eggs at least 48 s. Larvae 6 – 9 months, 1 month and tw egatoma, L. serricorne and D. maculatu ects were prepared in each stage-species 2 sulfuryl fluoride concentrations and o osed to sulfuryl fluoride contained in gl centrations for 22 hours at $26.5 \pm 0.5^{\circ}$ C	l adults of erricorne and hours and wo months for is respectively. s combinations one control. The ass desiccators . After					

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5			
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/09 Furniture carpet beetle (Anthrenus flavipes) Black carpet beetle (Attagenus megatoma) Cigarette beetle (Lasioderma serricorne) Hide beetle (Dermestes maculatus) Laboratory studies (Ref. Z9)					
		fumigation daily hatch was recorded	assessments for larvae and pupae n ed until no further changes occurre	nortality and egg d.			
5.2	Reliability	Reliability indica accepted scientifi methodological d results.	tor 2: Study conducted in accordance principles, possibly with incompleficiencies, which do not affect the	nce with generally lete reporting or e quality of relevant			
5.3	Assessment of efficacy, data analysis and interpretation	Larvae and adults maculatus were m egg stage. The eg permeability pote tissues, especially generally more di serricorne. D. m for its higher susc and thus absorbed eggs were approx stage of A. flavipe almost two times	s of A. <i>flavipes</i> , A. <i>megatoma</i> , L. <i>se</i> nore susceptible to sulfuryl fluoride gg stage is more tolerant probably lential and uptake of the fumigant by the chorion. A. <i>flavipes</i> and A. <i>ma</i> ifficult to kill with sulfuryl fluoride <i>aculatus</i> was the most susceptible ceptibility was probably because it d more fumigant than the other spe scimately twice as tolerant to sulfury <i>es.</i> However, A. <i>megatoma</i> adults more susceptible than those of A. <i>j</i>	<i>erricorne</i> and <i>D</i> . e compared to the because of its lower y epiembryonic <i>egatoma</i> were e compared with <i>L</i> . species. The reason is the most mobile cies. <i>A. megatoma</i> yl fluoride as the egg and larvae were <i>flavipes</i> .			
5.4	Conclusion	Total control of e serricorne and D. 26°C The dosage compared to the o (CT, concentration whilst a X 10 egg	ggs, larvae and adults of <i>A. flavipe</i> . <i>maculatus</i> can be achieved with s e required to achieve total control is other life stages. For post embryon on x time) of 200 g-h/m ³ would pro g rate, i.e. 2000 g-h/m ³ would be ne	es, A. megatoma, L. ulfuryl fluoride at s higher for eggs nic stages a dosage vide total control peeded.			
5.5	Proposed efficacy specification	Complete mortali <i>A. megatoma, L.</i>	ty (eradication) of eggs, larvae and serricorne and D. maculatus.	l adults A. <i>flavipes</i> ,			

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 3.1 The unit for the LC_{50} and LC_{99} values given in the table should be in g/m^3 .
Summary and conclusion	Applicant's version is adopted.

Criteria	Details
Family	Dermestidae.
	Anobiidae.
Species	Furniture carpet beetle (Anthrenus flavipes).
	Black carpet beetle (Attagenus megatoma).
	Cigarette beetle (Lasioderma serricorne).
	Hide beetle (Dermestes maculatus).
Source	<i>A. flavipes</i> and <i>A. megatoma</i> obtained from the Entomology Department, University of California, Riverside, USA. <i>L. serricorne</i> and <i>D. maculatus</i> were collected from the Florida State Museum, Gainesville, USA.
Life stage	Eggs, larvae and adults.
Insect age	Eggs at least 48 hours and adults $7 - 14$ days. Larvae $6 - 9$ months, 1 month and two months for <i>A</i> . <i>flavipes</i> , <i>A</i> . <i>megatoma</i> , <i>L</i> . <i>serricorne</i> and <i>D</i> . <i>maculatus</i> respectively.
Total number in test	Fifteen to 20 insects were prepared in each stage- species combinations for exposure to 12 sulfuryl fluoride concentrations and one control.

1.1 Test organisms - House Longhorn beetle

1.2	Test system
-----	-------------

Criteria	Details
Test chamber	Grease sealed 9 litre glass desiccator fumitorium fitted with septa mounted injection ports.
Number of chambers	Twelve.
Test insects introduction into chamber	All insects were placed in metal cages during the fumigation. The cages consisted of circular canisters (6.0 cm diameter, 1.9 cm high) capped snugly with a cover of 0.9 cm deep. A 6 cm ² opening was made in the cover and a 60-mesh metal screen was attached to allow free diffusion of sulfuryl fluoride.
Measuring equipment	Concentration of sulfuryl fluoride was measured with a gas chromatograph.

1.3 Application of test substance

Criteria	Details	5					
Application procedure	Syringe.						
Delivery method	Sulfuryl fluoride was introduced to the fumigatoria with gas tight syringes of appropriate volume.						
Dosage rate	Fumigation was completed for 22 hours a following concentration ranges						
	Stage A. fla. A. meg. L. ser. D. m						
	Egg	5-60	5 - 60	9-42	6 - 39		
	Larva	3-5.2	2 - 4.2	1.7 - 2.8	0.15 - 39		
	Adult	2 - 4.2	0.2 – 2.4	0.5 – 1.6	0.1 – 1.2		

Criteria	Details
Substrate	A piece of filter paper (4.25 cm diameter) was placed in the cage on which a small amount of dried beef and a thin layer of flour were placed for <i>D. maculatus</i> and <i>L. serricorne</i> respectively. Chicken feathers and finely ground cat food were provided for A. <i>megatoma</i> and <i>A. flavipes</i> adults and larvae during and after fumigation. Eggs were placed on double sided sticky tape attached to a microscope slide cover slip. For <i>D. maculatus</i> eggs, a dried piece of dried beef wrapped in cotton wool was attached to the centre of the tape. In the absence of food, newly emerged <i>D. maculatus</i> larvae cannibalised the unhatched eggs. No medium was provided for eggs other coleopterans because the sticky tape effectively trapped the emerging larvae.
Incubation temperature	$26.5 \pm 0.5^{\circ}$ C.
Moisture	Not available from report.

Dow AgroSciences RMS: Sweden		April 2004 Vikane Doc II					
Sectio	on B5.10.2	Efficacy	Data				
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/10 Powderpost beetle (<i>Lyctus brunneus</i>) Anobiid beetle (<i>Euvrilletta peltata</i> formerly <i>Xyletinus peltatus</i>) Field studies (Ref. Z10)					
		1 R	EFERENCE: Z10, B5.10.2/10	Official use only			
1.1	Reference	¹ William, I	L.H., and ² Sprenkel, R.J. (1990).				
		¹ Southern I Agriculture USA.	Forest Experiment Station, United States Department of e Forestry Service, Box 2008, GMF Gulfport, Mississippi	,			
		² Field Tecl Georgia, 3	nnical Service, Agricultural Products, DowElanco, Atlant 0346, USA.	a,			
		Ovicidal ac of various	ctivity of sulfuryl fluoride to Anobiid and Lyctid beetle eages.	ggs			
		Journal of	Entomological Science, Volume 25(3), pages 366 - 375.				
1.2	Data protection	Not protec	ted.				
1.2.1	Data owner	Data in the	public domain in published paper.				
1.2.2	Companies with letter of Access	Not releva	Not relevant.				
1.2.3	Criteria for data protection	No data protection claimed.					
1.3	Guideline study	The studies fumigation	s were undertaken on the basis of sound principles of practice.				
1.4	Deviations	Not application standard m	able as the study was not conducted to an international aethod.				
		2 M	ETHOD				
2.1	Test Substance (Biocidal Product)	Sulfuryl fl	uoride.				
2.1.1	Trade name/ proposed trade name	Vikane.					
2.1.2	Composition of Product tested	Sulfuryl flu	uoride.				
2.1.3	Physical state and nature	Fumigant.					
2.1.4	Monitoring of active substance concentration	Monitoring	g was undertaken using a Fumiscope gas analyser.				
2.1.5	Method of analysis	Not applica	able.				
2.2	Reference substance	No referen	ce substance was included in the study.				
2.2.1	Method of analysis for reference	Not application	able.				

Dow A RMS:	AgroSciences : Sweden	April 2004 Vikane	Doc III-B5						
Sectio	on B5.10.2	Efficacy Data	Efficacy Data						
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/10 Powderpost beetle (<i>Lyctus brunneus</i>) Anobiid beetle (<i>Euvrilletta peltata</i> formerly <i>Xyletinus peltatus</i>) Field studies (Ref. Z10)							
	substance								
2.3	Testing procedure								
2.3.1	Test population / inoculum / test organism	See Table 1.1.							
2.3.2	Test system	See Table 1.2.							
2.3.3	Application of test substance	See Table 1.3.							
2.3.4	Test conditions	See Table 1.4.							
2.3.5	Exposure time	6.5, 16 and 18 hours.							
2.3.6	Number of replicates performed	E. peltata							
		6 replicates for each fumigation.							
		L. brunneus							
		3 replicates for each fumigation.							
2.3.7	Controls	One control was included for each species and for each egg age combination.							
2.4	Examination								
2.4.1	Effect investigated	Mortality after fumigation with sulfuryl fluoride.							
2.4.2	Method for	Failure to hatch or develop embryo.							
	recording	For the Lyctid test units were examined 10 days eggs were laid be hatching should occur within $7 - 10$ days at the conditions at whic controls were stored. Eggs beneath the glass were examined first we microscope. Then the paraffin sealed eggs were separated so eggs the inner surfaces of each wood wafer could be examined. Mortal control eggs was determined by counting eclosed larvae. Because eggs contained developing embryos that may have survived, this evaluation procedure provided a conservative estimate for compar with survival in treated test units. Survival of larvae could not be determined because the test units were destroyed as they were examined.	cause h the with a on ity of many ison						
		First instar anobid larvae bored into the wood directly beneath the without moving the shell; thus, egg shells ruptured carefully with a needle to determine if fumigation arrested development of the emb Developing embryos may have been injured by rupturing the egg s particularly when eggs were deep with the cracks; therefore two evaluations procedures were used for confirmation of mortality. Contents of half of the eggs on each test block were examined after days for developing live larvae by rupturing egg shells. Blocks be the remaining eggs were stored for 10 months at $25 \pm 2.0^{\circ}$ C and 60 70% relative humidity and then x-rayed to count the developing la	egg a pryo. shell, r 14 aring) – rvae						

Dow A	AgroSciences : Sweden	April 2004			Vika	ne				Doc]	III-B5
Sectio	on B5.10.2	Efficacy D)ata								
Annex TNsG: Pt. III	Point IIB5.10 Pt. I-B5.10, -Ch. 6	B5.10.2/10 Powderpost beetle (<i>Lyctus brunneus</i>) Anobiid beetle (<i>Euvrilletta peltata</i> formerly <i>Xyletinus peltatus</i>) Field studies (Ref. Z10)									
		within wood	within wood.								
2.4.3	Intervals of examination	See 2.4.2.									
2.4.4	Statistics	Mean percen	tage surv	vival fo	r eggs	aged 1	– 7 da	ys was o	determ	nined.	
2.4.5	Post fumigation monitoring	See 2.4.2.									
		3 RES	SULTS								
3.1	Efficacy	Lyctus brunn	eus eggs								
		At the lower of 1 and 2 da where 100% all egg ages a	dosages bys old w mortality at the hig	tested, as reco / was r her dos	289 and orded c ecorde sages c	nd 470 ompare d. Tot of 1120	g-h/m ³ ed with al mort and 19	, some s all othe ality wa 900 g-h/	surviva er old e as reco m ³ .	al of eggs eggs rded for	
		Mean pero	centage s followin	urviva g fumi	al of 1 igatior	– 7 da n with	y old sulfury	<i>Lyctus l</i> /l fluori	<i>brunne</i> de.	eus eggs	
		Dosage	Mean	percent	tage su	rvival	of eggs	aged 1	– 7 da	uys ¹	
		g-h/m ³	7	6	5	4	3	2	1	All Ages	
		289	0.0	0.0	0.0	0.0	0.0	70.2	11.1	11.6	
		470	0.0	0.0	0.0	0.0	0.0	24.7	2.3	3.9	
		1120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		1900	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		Untreated	49.5	78.7	46.9	49.2	74.8	93.0	61.9	9 54.6	
		Eurilletta pe	ltata egg	5							
		At the lower dosages tested, 289 and 470 g-h/m ³ , some survival of eggs of 2, 3 and 4 was recorded. A low level of survival was also recorded for 5 day old eggs following at 289 g-h/m ³ . Total mortality was for all other egg ages. No survival of all egg ages at the higher dosages of 1120 and 1900 g-h/m ³ observed by egg hatch or by x-ray determination of developing larvae.									
		Mean perc	entage s followin	urviva g fumi	l of 1 - igatior	- 7 day n with	y old <i>E</i> sulfury	<i>uvrilleti</i> /l fluori	<i>ta pelti</i> de.	ata eggs	
		Dosage	Mean	percent	tage su	rvival	of eggs	aged 1	– 7 da	uys ¹	
		g-h/m ³	7	6	5	4	3	2	1 A	All Ages	
		289	6.0	0.0	7.6	15.0	8.7	7.4	0.0	6.4	
		470	0.0	0.0	0.0	15.2	31.7	15.8	0.0	9.0	
		1120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

1900

0.0 0.0 0.0 0.0 0.0

0.0 0.0 0.0

Dow AgroSciences RMS: Sweden		April 2004			Vika	ane				Doc]	III-B5
Section B5.10.2		Efficacy Da	ta								
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/10 H Anobiid bee <i>peltatus</i>) Field studie	Powo etle (es (R	lerpos <i>Euvri</i> Ref. Z1	st bee <i>lletta</i> 10)	tle (L peltat	<i>yctus</i> ta fori	<i>bruni</i> merly	neus) Xylei	tinus	
		Untreated	78.9	97.9	65.0	100.0	100.0	100.0	-	91.8	
Mean percentage survival of 1 – 7 day old <i>Euvrilleta</i> following fumigation with sulfuryl fluoride as detern examination for developing larvae 10 month		<i>etta pel</i> rmine ths late	<i>ltata</i> eggs d by x-ray er.								
		Dosage	Mean	n percer	ntage si	urvival	of egg	s aged	1 - 7 c	lays ¹	
		g-h/m ³	7	6	5	4	3	2	1	All Ages	
		289	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		470	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		1120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		1900	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
		Untreated	20.0	88.9	41.6	36.6	69.4	56.4	48.7	51.6	
3.1.1	Dose/Efficacy curve	For <i>L. brunneus</i> eggs of all ages, $1 - 7$ days old, sulfuryl fluoride dosages of 289, 470 and 1120 g-h/m ³ achieved 88.4, 96.1 and 100% control respectively. For <i>E. peltata</i> eggs of all ages, $1 - 7$ days old, sulfuryl fluoride dosages of 289, 470 and 1120 g-h/m ³ achieved 93.6, 91.0 and 100% control respectively.									
3.1.2	Begin and duration of effects	Mortality effec	ts ass	essed a	fter fu	migatio	on.				
3.1.3	Observed effects in the post monitoring phase	No unusual eff	No unusual effect observed.								
3.2	Effects against organisms or objects to be protected	None reported.									
3.3	Other effects	None reported.									
3.4	Efficacy of the reference substance	No reference su	ubstaı	nce was	s used.						
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.									
3.6	Efficacy limiting factors										
3.6.1	Occurrences of resistances	None reported.									
3.6.2	Other limiting	None reported.									

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Section B5.10.2		Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/10 Pow Anobiid beetle <i>peltatus</i>) Field studies (vderpost beetle (<i>Lyctus brunneus</i>) (<i>Euvrilletta peltata</i> formerly <i>Xyletin</i> Ref. Z10)	nus
factors				
		4 RELEVA FIELD C	NCE OF THE RESULTS COMPARED 7 ONDITIONS	го
4.1	Reasons for laboratory testing	Field study underta	aken.	
4.2	Intended actual scale of biocide application	In structures and w	vooden material infested with the beetles.	
4.3	Relevance compared to field conditions			
4.3.1	Application method	The principle of fu sufficient period o target pest. There to achieve this alth	migation is to confine a sufficient concentrat f time to enable a toxic dose to be received b are a number of ways in laboratory and field ough the principle is the same.	tion for a y the studies
4.3.2	Test organism	Powderpost beetle	(Lyctus brunneus)	
		Anobiid beetle (Eu	wrilletta peltata formerly Xyletinus peltatus)	
4.3.3	Observed effect	The desired result peltata is to achie dosages it was pos	through fumigation of eggs of <i>L. brunneus</i> at ve 100% control, i.e., eradication. Using a ra sible to establish dosages which achieved thi	nd <i>E.</i> ange of s result.
4.4	Relevance for read-across	Data considered to	be relevant for powder post beetles and and	biids.
		5 APPLIC	ANT'S SUMMARY AND CONCLUSION	
5.1	Materials and methods	Eggs of 1-7 day ol fumigated with sul building was a vac sheeting. Fans we were obtained from wooden test units a fumigant was teste and 1900 g-h/m ³ at periods of 6.5, 16 a with a Fumiscope was completed by	d of <i>Lyctus brunneus</i> and <i>Euvrilletta peltata</i> furyl fluoride under field conditions. The ter ant three bedroom house covered with polye re used to introduce sulfuryl fluoride. Beetle n laboratory insects and introduced into the h at various locations. The ovicidal activity of d by exposing the eggs to dosages of 289, 47 and 19 hours. Fumigant concentration was n gas analyser. After fumigation mortality asse examination for egg hatch and larval develop	were st thylene e eggs house in the 70 1120 posure neasured eessment pment.
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordance with ger principles, possibly with incomplete reportin ficiencies, which do not affect the quality of	nerally ng or relevant
5.3	Assessment of efficacy, data	The results of this have been laid 48	study suggests that eggs of <i>L. brunneus</i> beetl to 72 hours before fumigation and eggs of <i>E</i> .	les that <i>peltata</i>

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5	
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/10 Powderpost beetle (<i>Lyctus brunneus</i>) Anobiid beetle (<i>Euvrilletta peltata</i> formerly <i>Xyletinus peltatus</i>) Field studies (Ref. Z10)			
	analysis and interpretation	that have been laid most tolerant to su anobiid and lyctid the formation of er species at the lowe sulfuryl fluoride m sulfuryl fluoride ap results obtained by	< 4 days before fumigation are t lfuryl fluoride. This difference in eggs is probably due to the longe nbryos in anobiid eggs. Control r rate of 289 g-h/m ³ suggests tha ight occur quickly for beetles. T opears particularly true for anobii r rupturing egg shells.	the respective ages in ages of tolerant er time required for of most eggs of both t the toxic activity of the quick action of id eggs based on	
		Because anobiid be an alternative strat complete kill of the percentage of the p the period when ar normally early spri could be used as the	eetles produce only one generation egy to using the high rates necess e more tolerant eggs that may on population. Fumigations could be tobiid adults are likely to be emer- ing and late summer. This would be most tolerant egg stage would	on per year there is sary to achieve ly represent a small e done before or after rging and laying eggs d mean lower dosages be absent.	
5.4	Conclusion	Total control of eg with sulfuryl fluor mortality of eggs c	gs of <i>L. brunneus</i> and <i>E. peltata</i> ide at 22.2°C The dosage tested v if 1 - 7 days old of these species	can be achieved which achieved total was 1120 g-h/m ³ .	
5.5	Proposed efficacy specification	Complete mortality eggs.	y (eradication) of powdery post a	nd Lyctid beetles	

	Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	October 2004.	
Comments	Field 5.1 The sentence should read: Four tests were completed with exposure periods of 6.5, 16 and $\underline{18}$ hours.	
Summary and conclusion	Applicant's summary and conclusion is adopted.	

1.1 Test organisms - Anobiid beetle (Euvilletta peltata), powder post beetle (Lyctus brunneus).

Criteria	Details	
Family	Anobiidae.	
	Lycidae	
Species	Anobid beetle - <i>Euvilletta peltata</i> .	
	Powder post beetle - Lyctus brunneus.	
Source	Laboratory reared.	
Life stage	Eggs.	
Egg age	1 – 7 days old.	
Total number in test	E. peltata	
	Test 1: 1455	

Dow AgroSciences	April 2004
RMS: Sweden	

Test 2: 1638
L. brunneus
2553

1.2 Test system

Criteria	Details
Test chamber	The test building was a vacant three bedroom house with a crawl space and partial basement on the Harrison Experimental Forest of the Southern Forest Experiment Station located 48.3 km north of Gulfport, Mississippi, USA. The building was covered with a 6 - mil clear polyethylene plastic and all seams were sealed with clamps and duct tape. After soaking the perimeter soil with water a ground seal (cover – to ground juncture) was created by placing the rolled ends of the tent in a trench and covering the plastic with wet sand continuously around the structure.
Number of chambers	One.
Test insects introduction into chamber	 <i>E. peltata</i> Cages containing the eggs were placed at 6 locations within the house. <i>L. brunneus</i> Cages containing the eggs were placed at 3 locations within the house. Controls Controls were brought to the fumigation site and stored in a nearby building.
Measuring equipment	Concentration of sulfuryl fluoride was measured with a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	See delivery method.
Delivery method	Sulfuryl fluoride was introduced into the basement and kitchen hallway and rapidly distributed throughout the structure with the use of fans.
Dosage rate	A 'slide rule' calculator Fumiguide B was used to estimate how well the structure confined the gas. This dosage calculation is used to compensate for field variations when instruments are not used to monitor and confirm HLT (half loss time – time taken in hours to lose 50% concentration).
	The actual accumulated dosages (CT concentration x time) evaluated in four fumigations were
	289, 470, 1,120 and 1900 g-h/m ³ .

Dow AgroSciences	April 2004
RMS: Sweden	

1.4	Test conditions

Criteria	Details
Substrate	<i>E. peltata</i> Sanded yellow popular (<i>Liriodendron tulipifera</i>) sapwood blocks measuring 12.7 x 51.0 x 76 mm were nutrient treated and dried. Approximately 125 egg laying sites were impressed on each tangential surface of each block with a 44.5 mm diameter metal cut flower holder. A plastic spacer ring exposed only the points of the metal tines. From $2 - 10$ laboratory adults beetles were confined over the egg laying sites in an inverted hollow polyethylene stopper held in place with a rubber band. A 32 mesh copper screen fused in place of the stopper bottom allowed air movement into the unit.
	<i>L. brunneus</i> Yellow poplar wood wafers, 3.2 mm thick and the same size as microscope slides, containing pores too small for insertion of eggs were soaked in 3.0% starch solution to make them attractive to egg laying female beetles and then dried . Two starch soaked wafers were sealed between two glass microscope slides by dipping each end of the 'sandwich' in melted paraffin. Individual test units were confined with 5 – 40 adults in Pyrex storage jars containing a layer of plaster of paris on the bottom as a foothold for crawling beetles.
	Both species of beetles were placed on new test units every 24 hours until sufficient test units with eggs aged $1 - 7$ days old were obtained for each of four fumigations. After 24 hours the beetles were removed and units with eggs were marked with the day's date as '0' day. Each age, day 1 to day 7, represents 48 hours; therefore, day 1 is $1 - 2$ day old eggs, day 2 is $2 - 3$ day old eggs etc.
Incubation temperature	Fumigation temperature: 22.2°C.
	Before and after fumigation all egg test units and comparable controls were stored at $25 \pm 2.0^{\circ}$ C.
Moisture	Before and after fumigation all egg test units and comparable controls were stored at $60 - 70\%$ relative humidity.

Section B5.10.2		Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/11 Anobium punctatum Laboratory study (Ref. Z11)		
			Official	
	D 4	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	use only	
1.1	Reference	Binker, G., Binker, J., Fröba G., Graf, E. and Lanz, B (1995).		
		² EVIDA G i E la LL la de circa S D 4 4 i L T di LD		
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.		
		Laboratory study on Anobium punctatum Number: 121641.		
1.2	Data protection	Yes.		
1.2.1	Data owner	Dow AgroSciences LLC.		
1.2.2	Companies with letter of Access	None.		
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p.for the purpose of its entry into Annex I		
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.		
1.4	Deviations	Not applicable as the study not conducted to an international standard method.		
		2 METHOD		
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.		
2.1.1	Trade name/ proposed trade name	Vikane.		
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.		
2.1.3	Physical state and nature	Fumigant.		
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.		
2.1.5	Method of analysis	Not applicable.		
2.2	Reference substance	No reference substance was included in the study.		
2.2.1	Method of analysis for reference substance	Not applicable.		
2.3	Testing procedure			
2.3.1	Test population / inoculum / test organism	See Table 1.1.		

Dow AgroSciences RMS: Sweden		April 2004	Vikane Do	c III-B5	
Sectio	on B5.10.2	Efficacy Dat	a		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/11 Anobium punctatum Laboratory study (Ref. Z11)			
2.3.2	Test system	See Table 1.2.			
2.3.3	Application of TS	See Table 1.3.			
2.3.4	Test conditions	See Table 1.4.			
2.3.5	Duration of the test / Exposure time	85 hours and 15	minutes.		
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	Untreated contro same conditions	ols were included; these were kept and stored under the s as the treated eggs of <i>A. punctatum</i> .	X	
2.4	Examination				
2.4.1	Effect investigated	Lethal accumula determined 114	ated dosage (LAD) expressed as g-h/m ³ . The LAD was days after treatment.		
2.4.2	Method for recording / scoring of the effect	Egg mortality by eggs 114 days a	y examination (count) of larvae hatched from treated fter treatment.		
2.4.3	Intervals of examination	Larvae hatched from treated eggs 114 days after treatment.			
2.4.4	Statistics	Post fumigation mean total mortality was calculated by dividing the number of dead eggs by the total number of treated eggs 114 days after treatment.		r	
2.4.5	Post fumigation monitoring of the test organism	The total mortal 114 days after fr	ity-effect of sufuryl fluoride on eggs was determined umigation.		
		3 RESU	LTS		
3.1	Efficacy	The percentage hatched and sur	mortality was calculated by dividing the total number of viving larvae by the total number of treated eggs.	of X	

Percentage mortality of eggs of *Anobium punctatum* 114 days after exposure to sulfuryl fluoride

А	Untreated Control			
No.	Eggs	Larvae	Larvae	Dead larvae
		hatched	penetrated	
1	95	54	54	0
2	40	27	27	0
3	299	257	257	0
4	67	52	52	0
5	77	53	53	0
6	44	10	10	0
8	36	11	11	0
9	227	158	158	0
10	54	30	30	0
total	939	652	652	0

Dow AgroSciences April 2004 RMS: Sweden

В	Treated eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
11	139	35	29	6
12	82	28	17	11
13	169	15	15	0
14	45	13	11	2
15	166	12	12	0
16	67	23	19	4
17	122	15	15	0
18	98	5	5	0
19	40	13	11	2
20	158	12	11	1
21	56	1	0	1
22	20	4	2	2
23	79	12	8	4
24	139	40	40	0
25	83	11	11	0
26	91	10	4	6
27	87	19	13	6
28	112	22	20	2
29	49	8	6	2
30	156	62	57	5
31	118	25	18	7
32	59	26	20	6
33	157	42	38	4
34	173	47	47	0
35	94	36	35	1
36	109	40	31	9
37	101	5	4	1
38	144	27	22	5
39	58	4	4	0
40	82	4	2	2
41	112	16	2	0
42	38	8	3	0
43	181	17	5	0
44	194	43	40	3
45	81	24	24	0
46	98	27	26	1
47	153	25	23	2
48	67	8	8	0
49	122	17	17	0
50	79	21	10	11
51	73	55	55	0
52	103	90	90	0
53	125	117	117	0
54	54	47	47	0
55	57	56	56	0
56	63	48	48	0
57	129	117	117	0
58	108	99	99	0
59	108	88	88	0
60	144	112	112	0
total	5142	1651	1514	106

Total mortality of untreated eggs: 30.56%

Total mortality of treated eggs: 69.95%

Section B5.10.2		Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/11 Anobium punctatum Laboratory study (Ref. Z11)		
3.1.1	Dose/Efficacy curve	Not available from report.		
3.1.2	Begin and duration of effects	The mortality of 69.96 % was achieved 114 days after treatment.		
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.		
3.2	Effects against organisms or objects to be protected	None reported.		
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	No reference substance was used.		
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported		
3.6.2	Other limiting factors	None reported		
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS		
4.1	Reasons for	1 Precise conditions could be determined.		
labor	laboratory testing	2 Practical, accurate procedure.		
		Data generated is considered relevant for field of use, test insects obtained from the field.		
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions			
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies		

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5	
Section B5.10.2		Efficacy Data			
TNsG: Pt. III-	Pt. I-B5.10, Ch. 6	B5.10.2/11 Anobium punctatum Laboratory study (Ref. Z11)			
		to achieve this alth	nough the principle is the same.		
4.3.2	Test organism	There are differen considered to be the fluoride compared	t life stages of <i>Anobium punctatum</i> . E he stage which would require a higher l to the other stages.	ggs are • dose of sulfuryl	
4.3.3	Observed effect	The limited mortality effect, recorded in the laboratory test is too low to achieve complete control of eggs under field conditions, but nevertheless it is important to determine sub-lethal dose rates for precise definition of LAD		test is too low to , but e rates for precise	
4.4	Relevance for read-across	Not applicable.			
		5 APPLIC	ANT'S SUMMARY AND CONCLU	USION	
5.1	Materials and methods	Eggs of Anobium, 85 hours and 15 m laboratory fumitor to EN 49.1 (1992) Wirkung gegenüb der Eiablage und o behandlung (Labo Fumigant concent Mortality was eva	<i>punctatum</i> were fumigated with sulfur ninutes at 24 °C and 50 % relative hun ia. Bioassays from laboratory popula ("Holzschutzmittel - Bestimmung de er Anobium punctatum (De Geer) dur des Überlebens von Larven - Teil 1: O ratoriumsverfahren)") were tested to o ration was measured using a Fumisco luated 114 days after treatment.	ryl fluoride for nidity in ition according r vorbeugenden rch Beobachten Oberflächen- determine LAD. pe gas-analyser.	
5.2	Reliability	Reliability indicat accepted scientific methodological de results.	or 2: Study conducted in accordance v principles, possibly with incomplete efficiencies, which do not affect the qua	with generally reporting or ality of relevant	
5.3	Assessment of efficacy, data analysis and interpretation	The result of this i conditions comple Additional trials n for complete mort	investigation demonstrates that under ete control of <i>A. punctatum</i> eggs was r ueed to be undertaken to determine the ality of this life stage.	the described not achieved. e dosage required	
5.4	Conclusion	There are differen wooden structures considered to be a efficacy of sulfury insect egg stage is necessary to evalu 100 % LAD to con	t life stages of <i>A. punctatum</i> present in The laboratory fumigation test under valid and effective procedure for eva <i>i</i> l fluoride on the eggs of <i>A. punctatum</i> known to be less susceptible to sulfur iate the required higher fumigant dose ntrol this life stage.	n infested ertaken was luating the n. Since the ryl fluoride it is rate to achieve	
5.5	Proposed efficacy specification	Total control – (no	ot achieved in this study).		

	Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	October 2004.	
CommentsField 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the incubation conditions before and after the test fumigations. These incul conditions were: temperature 20 C , 75% relative humidity. The condit fumigation is given in Table 1.4 with the untreated controls remaining incubation conditions of 20 °C , 75% relative humidity.		
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the table).	
	For clarification: Total mortality of treated eggs were calculated according:	
	No of total eggs – (no of larvae hatched – dead larvae) / no of total eggs	
	i.e. 5142-(1651-106)/5142*100 = 69.95%	
Summary and conclusion	Applicant's version is acceptable.	

1.1 Test organism - Anobium puntatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	5142.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) aluminium, $3 \ge 2 \ge 2$ 2 m = 12 m ³ , gas introduction via polyamide (PA) - lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In totally 5142 eggs on fifty boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes

Dow AgroSciencesApril 2004VikaneDoc III-B5RMS: Sweden

	an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas-analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the fumitoria in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a digital scale. Gas was mixed as it was injected into the fumatorium using a fan inside the fumitorium.
Dosage rate	Eggs All eggs were fumigated at 7.7 g/m ³ for a total exposure period of 85 hours and 15 minutes leading to an accumulated dosage of 657 g-h/m ³ .

Criteria	Details					
Incubation temperature	Fumigation was conducted at an average temperature of 24 °C.					
Moisture	Fumigation was conducted at an average 50 % relative humidity.					
Section B5.10.2		Efficacy Data				
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Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/12 Anobium punctatum Field study (Ref. Z12)				
		1 REFERENCE: Z12, B5.10.2/12	Official use only			
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1996).				
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany				
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.				
		Field study on Anobium punctatum Number: .123418/B and 123418/D.				
1.2	Data protection	Yes.				
1.2.1	Data owner	Dow AgroSciences LLC.				
1.2.2	Companies with letter of Access	None.				
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p.for the purpose of its entry into Annex I				
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.				
1.4	Deviations	Not applicable as the study not conducted to an international standard method.				
		2 METHOD				
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.				
2.1.1	Trade name/ proposed trade name	Vikane.				
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.				
2.1.3	Physical state and nature	Fumigant.				
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.				
2.1.5	Method of analysis	Not applicable.				
2.2	Reference substance	No reference substance was included in the study.				
2.2.1	Method of analysis for reference substance	Not applicable.				
2.3	Testing procedure					
2.3.1	Test population / inoculum / test organism	See Table 1.1.				

Dow AgroSciences RMS: Sweden		April 20	004 Vikane Doc	III-B5
Sectio Annex TNsG: Pt. III-	on B5.10.2 Point IIB5.10 Pt. I-B5.10, Ch. 6	Efficac B5.10.2 Field si	y Data 2/12 Anobium punctatum tudy (Ref. 712)	
		r iciu ș	(ittl: 212)	
2.3.2	Test system	See Tabl	e 1.2.	
2.3.3	Application of TS	See Tabl	e 1.3.	
2.3.4	Test conditions	See Tabl	e 1.4.	
2.3.5	Duration of the test / Exposure time	66 hours		
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreate same cor	d controls were included, these were kept and stored under the nditions as the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination			
2.4.1	Effect investigated	Lethal ac were det after trea	ccumulated dosage (LAD) expressed as g-h/m ³ . Two effects ermined – LAD 101 days after treatment and LAD 242 days attent.	
2.4.2	Method for recording / scoring of the effect	Egg-mor eggs 101 (i.e. 242	tality by examination (count) of larvae hatched from treated days after treatment and survival of these larvae 131 days later days after treatment).	Х
2.4.3	Intervals of examination	Larvae h survival	atched from treated eggs 101 days after treatment and larvae 242 days after treatment.	
2.4.4	Statistics	Post fum number o treatmen	igation mean total mortality was calculated by dividing the of dead eggs by the total number of treated eggs 101 days after t and 242 days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4	k.	
		3	RESULTS	
3.1	Efficacy	The perc hatched	entage mortality was calculated by dividing the total number of and surviving larvae by the total number of treated eggs.	Х

Percentage mortality of eggs of *Anobium punctatum* 101 days after exposure to sulfuryl fluoride.

exposure to summry mornae.					
A	Untreated Control				
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae	
71	269	266	266	0	
72	103	80	80	0	
73	158	154	154	0	
74	120	118	118	0	
75	76	72	72	0	
76	156	154	154	0	
77	89	82	82	0	
78	117	112	112	0	
79	156	154	154	0	

Dow AgroSciences April 2004 Vikane RMS: Sweden

Doc I	II-B5
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80	100	82	82	0
total	1344	1274	1274	0

Total mortality of untreated eggs 5.21%.

В		Treate	d Eggs	
No.	Eggs	Larvae hatched	Larvae	Dead larvae
81	262	7	7	0
82	159	2	2	0
83	65	0	0	0
84	91	0	0	0
85	132	1	1	0
86	162	1	1	0
87	205	1	1	0
88	186	2	2	0
89	267	1	1	0
90	175	5	5	0
91	67	2	2	0
92	137	1	1	0
93	272	6	6	0
94	181	3	3	0
95	129	0	0	0
96	100	5	5	0
97	184	1	1	0
98	249	0	0	0
99	159	5	5	0
100	337	0	0	0
101	70	0	0	0
102	162	1	1	0
103	194	0	0	0
104	98	0	0	0
105	157	4	4	0
106	58	4	4	0
107	205	23	23	1
108	237	8	8	1
109	200	3	3	0
110	154	3	3	0
111	216	1	1	0
112	59	11	11	0
113	55	0	0	0
114	178	1	1	0
115	243	1	1	0
116	112	1	1	0
117	231	1	1	0
118	235	2	2	0
119	351	8	8	0
120	92	2	2	0
121	104	1	1	0
122	78	0	0	0
123	177	10	10	0
124	83	0	0	0

Dow AgroSciences April 2004 Vikane RMS: Sweden

125	117	6	6	0
126	156	0	0	0
127	165	4	4	0
128	61	5	5	0
129	56	0	0	0
130	58	1	1	0
total	7881	146	144	0

Total mortality of treated eggs: 98.17%.

Percentage mortality of eggs of *Anobium punctatum* 242 days after exposure to sulfuryl fluoride.

	exposure to summinuor nuclear					
Α	Untreated Control					
No.	Eggs	Larvae	Larvae	Larvae		
		hatched	penetrated	survived		
71	269	266	266	81		
72	103	80	80	76		
73	158	154	154	93		
74	120	118	118	73		
75	76	72	72	65		
76	156	154	154	96		
77	89	82	82	52		
78	117	112	112	83		
79	156	154	154	98		
80	100	82	82	45		
total	1344	1274	1274	762		

Total mortality of untreated eggs: 43.3%.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
81	262	7	7	0
82	159	2	2	0
83	65	0	0	0
84	91	0	0	0
85	132	1	1	0
86	162	1	1	0
87	205	1	1	1
88	186	2	2	0
89	267	1	1	1
90	175	5	5	0
91	67	2	2	0
92	137	1	1	1
93	272	6	6	1
94	181	3	3	1
95	129	0	0	0
96	100	5	5	4
97	184	1	1	0
98	249	0	0	0
99	159	5	5	2

Dow AgroSciences		April 2004	Vikane		
RMS: Swed	len	_			
1	1	1 -	-		
100	337	0	0	0	
101	70	0	0	0	
102	162	1	1	0	
103	194	0	0	0	
104	98	0	0	0	
105	157	4	4	1	
106	58	4	4	0	
107	205	24	23	6	
108	237	9	8	3	
109	200	3	3	0	
110	154	3	3	0	
111	216	1	1	1	
112	59	11	11	0	
113	55	0	0	0	
114	178	1	1	0	
115	243	1	1	0	
116	112	1	1	0	
117	231	1	1	0	
118	235	2	2	1	
119	351	8	8	1	
120	92	2	2	0	
121	104	1	1	0	
122	78	0	0	0	
123	177	10	10	3	
124	83	0	0	0	
125	117	6	6	2	
126	156	0	0	0	
127	165	4	4	0	
128	61	5	5	0	
129	56	0	0	0	
130	58	1	1	0	
total	7881	146	144	29	

Doc III-B5

Total mortality of treated eggs: 99.63%.

Section	n B5.10.2	Efficacy Data			
Annex I TNsG: 1 Pt. III-0	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/12 Anobium punctatum Field study (Ref. Z12)y			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 98.17 % was achieved 101 days after treatment and of 99.63 % 242 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for laboratory testing	Not applicable.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions	Not applicable.			
4.3.1	Application method	Not applicable.			
4.3.2	Test organism	Anobium punctatum eggs.			
4.3.3	Observed effect	Egg mortality.			
4.4	Relevance for read-across	Not applicable.			

Dow A	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/12 An Field study (R	obium punctatum Ref. Z12)y	
		5 APPLIC	CANT'S SUMMARY AND CONCLUS	ION
5.1	Materials and methods	Eggs of Anobium 66 hours at 12 °C of a volume of 10 according to EN 4 vorbeugenden Wi durch Beobachter Oberflächenbehar determine LAD. H Fumiscope gas an days after treatme	<i>punctatum</i> were fumigated with sulfuryl in a practical fumigation under field con 000 m ³). Bioassays from laboratory popu 49.1 (1992) ("Holzschutzmittel - Bestimm irkung gegenüber Anobium punctatum (I n der Eiablage und des Überlebens von L ndlung (Laboratoriumsverfahren)") were Fumigant concentration was measured us nalyser. Mortality rate was evaluated 101 ent.	fluoride for dition (church lation nung der De Geer) arven - Teil 1: tested to sing a days and 242
5.2	Reliability	Reliability indicat accepted scientific methodological de results.	tor 2: Study conducted in accordance wit c principles, possibly with incomplete re eficiencies, which do not affect the quali	h generally porting or ty of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this complete a high lo achieved. Additio variability of the o specific life stage	investigation that under the described co evel of control of <i>Anobium punctatum</i> eg onal trials need to be performed to unders dose rates of the fumigant to achieve the at different temperatures.	nditions a gs was stand the LAD for this
5.4	Conclusion	There are different wooden structures to be a valid and e sulfuryl fluoride of showed that sulfu species.	nt life stages of <i>Anobium punctatum</i> prese s. The field fumigation test undertaken v effective procedure for evaluating the eff on the eggs of <i>A. punctatum</i> . The efficac ryl fluoride was highly effective on eggs	ent in infested vas considered icacy of y results of this pest
5.5	Proposed efficacy specification	Control of eggs is 2085 g-h/m ³ at a t	s excellent 99.63% mortality at the evaluatemperature of 12 °C.	ated LAD of
		Evolution b-	Compotent Authorities	

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 2.4.2. The sentence should read: Egg-mortality by examination (count) of larvae <u>penetrated</u> from treated eggs 101 days after treatment and survival of these larvae 131 days later (i.e. 242 days after treatment).
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legends above the tables).
Summary and conclusion	Applicant's version is acceptable.

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	7881.

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 1000 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In totally 7881 eggs on fifty boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected into the structure using a fan inside the structure.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 31.6 g/m ³ for a total exposure period of 66 hours leading to an accumulated dosage of 2085 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 12 °C.
Moisture	Not available from report.

Section B5.10.2 Efficacy Data				
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/13 Anobium punctatum Field study (Ref. Z13)		
		1 REFERENCE: Z13, B5.10.2/13	Official use only	
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1996).		
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany		
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.		
		Field study on Anobium punctatum Number: 123418/C and 123418/D.		
1.2	Data protection	Yes.		
1.2.1	Data owner	Dow AgroSciences LLC.		
1.2.2	Companies with letter of Access	None.		
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I		
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.		
1.4	Deviations	Not applicable as the study not conducted to an international standard method.		
		2 METHOD		
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.		
2.1.1	Trade name/ proposed trade name	Vikane.		
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.		
2.1.3	Physical state and nature	Fumigant.		
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.		
2.1.5	Method of analysis	Not applicable.		
2.2	Reference substance	No reference substance was included in the study.		
2.2.1	Method of analysis for reference substance	Not applicable.		
2.3	Testing procedure			
2.3.1	Test population / inoculum / test organism	See Table 1.1.		

Dow AgroSciences RMS: Sweden		April 2004 Vikane Doc	(II-B5
Sectio	on B5.10.2	Efficacy Data	
Annex TNsG: Pt. III-	Point 11B5.10 Pt. I-B5.10, Ch. 6	B5.10.2/13 Anobium punctatum Field study (Ref. Z13)	
2.3.2	Test system	See Table 1.2.	
2.3.3	Application of TS	See Table 1.3.	
2.3.4	Test conditions	See Table 1.4.	
2.3.5	Duration of the test / Exposure time	62 hours and 30 minutes.	
2.3.6	Number of replicates performed	One.	
2.3.7	Controls	Untreated controls were included; these were kept and stored under the same conditions as the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination		
2.4.1	Effect investigated	Lethal accumulated dosage (LAD) expressed as $g-h/m^3$. Two effects were determined – LAD 97 days after treatment and LAD 236 days after treatment.	
2.4.2	Method for recording / scoring of the effect	Egg-mortality by examination (count) of larvae hatched from treated eggs 97 days after treatment and survival of these larvae 139 days later (i.e. 236 days after treatment).	
2.4.3	Intervals of examination	Larvae hatched from treated eggs 97 days after treatment and larvae survival 236 days after treatment.	
2.4.4	Statistics	Post fumigation mean total mortality was calculated by dividing the number of dead eggs by the total number of treated eggs 97 days after treatment and 236 days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.	
		3 RESULTS	
3.1	Efficacy	The percentage mortality was calculated by dividing the total number of hatched and surviving larvae by the total number of treated eggs.	Х

Percentage mortality of eggs of *Anobium punctatum* 97 days after exposure to sulfuryl fluoride.

exposure to summry muoride.				
A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
141	226	204	204	0
142	227	209	209	0
143	221	204	204	0
144	184	164	164	0
145	177	171	171	0
146	212	200	200	0
147	213	209	209	0
148	338	310	310	0
149	292	282	282	0

Dow AgroSciencesApril 2004VikaneDoc III-B5RMS: Sweden

150	262	248	248	0
total	2352	2201	2201	0

Total mortality of untreated eggs 6.42%.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
151	159	0	0	0
152	211	0	0	0
153	154	0	0	0
154	121	1	1	0
155	248	4	4	0
156	209	0	0	0
157	308	5	5	0
158	314	0	0	0
159	247	0	0	0
160	128	4	4	0
161	276	1	1	0
162	175	0	0	0
163	312	3	3	0
164	211	3	3	0
165	391	1	1	0
166	337	1	1	0
167	342	0	0	0
168	344	1	1	0
169	239	10	10	0
170	249	18	18	0
171	121	1	1	0
172	193	1	1	0
173	206	0	0	0
174	224	2	2	0
175	269	0	0	0
176	280	1	1	0
177	326	1	1	0
178	266	1	1	0
179	311	1	1	0
180	362	20	20	0
181	270	1	1	0
182	234	2	2	0
183	359	6	6	0
184	201	2	2	0
185	235	29	29	0
186	278	5	5	0
187	130	0	0	0
188	269	3	3	0
189	304	2	2	0
190	212	8	8	0
191	351	0	0	0
192	249	6	6	0

Dow AgroSciences April 2004 Vikane RMS: Sweden

193	209	9	9	0
194	281	3	3	0
195	305	25	25	0
196	176	1	1	0
197	236	4	4	0
198	275	3	3	0
199	217	1	1	0
200	150	3	3	0
total	12474	193	193	0

Total mortality of treated eggs: 98.45%.

Percentage mortality of eggs of *Anobium punctatum* 236 days after exposure to sulfuryl fluoride.

	exposure to summinue.				
	Untreated Control				
No.	Eggs	Larvae	Larvae	Larvae	
		hatched	penetrated	survived	
141	226	204	204	151	
142	227	209	209	112	
143	221	204	204	97	
144	184	164	164	89	
145	177	171	171	113	
146	212	200	200	121	
147	213	209	209	98	
148	338	310	310	109	
149	292	282	282	116	
150	262	248	248	94	
total	2352	2201	2201	1100	

Total mortality of untreated eggs: 53.23%.

В		Treate	d Eggs	
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
151	159	0	0	0
152	211	0	0	0
153	154	0	0	0
154	121	1	1	0
155	248	4	4	0
156	209	0	0	0
157	308	5	5	0
158	314	0	0	0
159	247	0	0	0
160	128	4	4	0
161	276	1	1	0
162	175	0	0	0
163	312	3	3	0
164	211	3	3	0
165	391	1	1	0
166	337	1	1	0
167	342	0	0	0

Dow AgroSciences		April 2004		Vikane
RMS: Swed	len			
168	344	1	1	0
169	239	10	10	0
170	249	18	18	0
171	121	1	1	0
172	193	1	1	0
173	206	0	0	0
174	224	2	2	0
175	269	0	0	0
176	280	1	1	0
177	326	1	1	0
178	266	1	1	0
179	311	1	1	0
180	362	20	20	3
181	270	1	1	0
182	234	2	2	0
183	359	6	6	0
184	201	2	2	1
185	235	29	29	3
186	278	5	5	0
187	130	0	0	0
188	269	3	3	2
189	304	2	2	0
190	212	8	8	1
191	351	0	0	0
192	249	6	6	0
193	209	9	9	0
194	281	3	3	0
195	305	25	25	4
196	176	1	1	1
197	236	4	4	0
198	275	3	3	0
199	217	1	1	1
200	150	3	3	0
total	12474	193	193	16

Doc III-B5

Total mortality of treated eggs: 99.87%.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/13 Anobium punctatum Field study (Ref. Z13)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 98.45 % was achieved 97 days after treatment and of 99.87 % 236 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for laboratory testing	Not applicable.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions	Not applicable.			
4.3.1	Application method	Not applicable.			
4.3.2	Test organism	Not applicable.			
4.3.3	Observed effect	Not applicable.			
4.4	Relevance for read-across	Not applicable.			

Dow RMS	AgroSciences S: Sweden	April 2004	Vikane	Doc III-B5
Secti	on B5.10.2	Efficacy Data		
Annez TNsG Pt. III	<pre>c Point IIB5.10 c: Pt. I-B5.10, I-Ch. 6</pre>	B5.10.2/13 An Field study (R	obium punctatum .ef. Z13)	
		5 APPLIC	ANT'S SUMMARY AND CO	NCLUSION
5.1	Materials and methods	Eggs of <i>Anobium</i> 62 hours and 30 m condition (church population accord Bestimmung der v punctatum (De Ge Überlebens von L (Laboratoriumsve concentration was rate was evaluated	<i>punctatum</i> were fumigated with ninutes at 19.8 °C in a practical f of a volume of 500 m ³). Bioass ing to EN 49.1 (1992) ("Holzsch orbeugenden Wirkung gegenüb- eer) durch Beobachten der Eiabla arven - Teil 1: Oberflächenbehar rfahren)") were tested to determ measured using a Fumiscope ga 197 days and 236 days after trea	sulfuryl fluoride for umigation under field ays from laboratory nutzmittel - er Anobium age und des ndlung ine LAD. Fumigant as analyser. Mortality ttment.
5.2	Reliability	Reliability indicat accepted scientific methodological de results.	or 2: Study conducted in accorda principles, possibly with incom eficiencies, which do not affect t	ance with generally plete reporting or he quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this i high level of contr Additional trials h the dose rates of t ¹ stage at different t	investigation was that under the color of <i>Anobium punctatum</i> eggs wave to be performed to understating the fumigant to achieve the LAD temperatures.	described conditions a was achieved. nd the variability of for this specific life
5.4	Conclusion	There are differen wooden structures to be a valid and e sulfuryl fluoride o showed that sulfu- species.	t life stages of <i>Anobium punctatu</i> . The field fumigation test under effective procedure for evaluating on the eggs of <i>A. punctatum</i> . The ryl fluoride was highly effective	um present in infested ertaken was considered g the efficacy of efficacy results on eggs of this pest
5.5	Proposed efficacy specification	Control of eggs is 1269 g-h/m ³ at a t	excellent 99.87% mortality at the emperature of 19.8 °C.	ne evaluated LAD of
		Evaluation by	Competent Authorities	
		EVALUATION 2	BY RAPPORTEUR MEMBEI	R STATE
Date		October 2004.		
Comn	nents	Field 2.3.7, The fo	ollowing is a revised version of t	he present entry:

.5	Field 2.5.7, The following is a revised version of the present entry.
	The untreated controls and treated eggs were kept and stored under the same
	incubation conditions before and after the test fumigations. These incubation
	conditions were: temperature 20 C, 75% relative humidity. The conditions during
	fumigation is given in Table 1.4 with the untreated controls remaining under
	incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not

Summary and conclusion Applicant's version is adopted.

1.1	Test organisms	- Anobium	punctatum
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Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	12474.

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 500 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total12474 eggs on fifty boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan positioned in the structure.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 20.3 g/m ³ for a total exposure period of 62 hours and 30 minutes leading to an accumulated dosage of 1269 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 19.8 °C.
Moisture	Not available from report.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10TNsG: Pt. I-B5.10,Pt. III-Ch. 6B5.10.2/14 Anobium punctatum Laboratory study (Ref. Z14)		B5.10.2/14 Anobium punctatum Laboratory study (Ref. Z14)			
		1 REFERENCE: 714 B5 10 2/14	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba, G., ² Graf, E. and ² Lanz, B (1997).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.			
		Laboratory study on <i>Anobium punctatum</i> Number: 125749/C and 125749/E (Bioassay 151 – 160).			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing a.s. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum / test organism	See Table 1.1.			

Dow AgroSciences RMS: Sweden		April 20	004 Vikane Doc I	III-B5
Section B5.10.2 Efficacy Data Annex Point IIB5.10 TNsG: Pt. I-B5.10 B5 10 2/14 Anobium punctatum				
Pt. III-	-Ch. 6	Labora	atory study (Ref. Z14)	
2.3.2	Test system	See Tabl	e 1.2.	
2.3.3	Application of TS	See Tabl	e 1.3.	
2.3.4	Test conditions	See Tabl	e 1.4.	
2.3.5	Duration of the test / Exposure time	54 hours	and 45 minutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreate same cor	d controls were included, these were kept and stored under the additions as the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination			
2.4.1	Effect investigated	Lethal ac were det treatmen	ccumulated dosage (LAD) expressed as $g-h/m^3$. Two effects ermined – LAD 89 days after treatment and LAD 228 days after t.	
2.4.2	Method for recording / scoring of the effect	Egg-mor eggs 89 ((i.e. 228	tality by examination (count) of larvae hatched from treated days after treatment and survival of these larvae 139 days later days after treatment).	
2.4.3	Intervals of examination	Larvae h survival	atched from treated eggs 89 days after treatment and larvae 228 days after treatment.	
2.4.4	Statistics	Post fum number o treatmen	igation mean total mortality was calculated by dividing the of dead eggs by the total number of treated eggs 89 days after t and 228 days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4	4.	
		3	RESULTS	
3.1	Efficacy	The perc hatched	entage mortality was calculated by dividing the total number of and surviving larvae by the total number of treated eggs.	Х

Percentage mortality of eggs of *Anobium punctatum* 89 days after exposure to sulfuryl fluoride.

exposure to summi yr muoride.				
A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
141	150	120	120	0
142	91	87	87	0
143	113	107	107	0
144	101	99	99	0
145	143	134	134	0
146	438	427	427	0
147	103	96	96	0
148	135	126	126	0
149	237	227	227	0
150	107	92	92	0
total	1618	1515	1515	0

Total mortality of untreated eggs: 6.37%.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
151	241	0	0	0
152	259	0	0	0
153	85	2	2	0
154	268	9	9	0
155	76	0	0	0
156	226	2	2	0
157	258	5	5	0
158	225	4	4	0
159	104	8	8	0
160	278	1	1	0
total	2020	31	31	0

Vikane

Total mortality of treated eggs: 98.47%.

Percentage mortality of eggs of Anobium punctatum	a 228 days after
exposure to sulfuryl fluoride.	

A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
141	150	120	120	95
142	91	87	87	49
143	113	107	107	86
144	101	99	99	78
145	143	134	134	104
146	438	427	427	321
147	103	96	96	86
148	135	126	126	79
149	237	227	227	119
150	107	92	92	55
total	1618	1515	1515	1072

Total mortality of untreated eggs: 33.75%.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
151	241	0	0	0
152	259	0	0	0
153	85	2	2	0
154	268	9	9	0
155	76	0	0	0
156	226	2	2	0
157	258	5	5	0
158	225	4	4	1
159	104	8	8	1
160	278	1	1	0
total	2020	31	31	2

Total mortality of treated eggs: 99.90%.

Dow A RMS:	AgroSciences : Sweden	April 2004 Vikane Do	c III-B5
Sectio	on B5.10.2	Efficacy Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/14 Anobium punctatum Laboratory study (Ref. Z14)	
3.1.1	Dose/Efficacy curve	Not available from report.	
3.1.2	Begin and duration of effects	A mortality of 98.47 % was achieved 89 days after treatment and of 99.90 % 228 days after treatment.	
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.	
3.2	Effects against organisms or objects to be protected	None reported.	
3.3	Other effects	None reported.	
3.4	Efficacy of the reference substance	No reference substance was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.	
3.6	Efficacy limiting factors		
3.6.1	Occurrences of resistances	None reported.	
3.6.2	Other limiting factors	None reported.	
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS	
4.1	Reasons for	1 Precise conditions could be determined.	
	laboratory testing	2 Practical, accurate procedure.	
		Data generated is considered relevant for field of use. Test insects obtained from the field.	
4.2	Intended actual scale of biocide application	Not applicable.	
4.3	Relevance compared to field conditions		
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.	
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Eggs are considered to be the stage which would require a higher dose of sulfuryl	

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/14 And Laboratory stu	obium punctatum 1dy (Ref. Z14)	
		fluoride compared	to the other stages.	
4.3.3	Observed effect	The high mortality effect, recorded in the laboratory test is considered as the desired field response for eradication of eggs of <i>Anobium punctatum</i> .		test is considered as Anobium
4.4	Relevance for read-across	Not applicable.		
		5 APPLIC	ANT'S SUMMARY AND CON(CLUSION
5.1	Materials and methods	Eggs of <i>Anobium p</i> 54 hours and 45 m laboratory fumitor to EN 49.1 (1992) Wirkung gegenübe der Eiablage und d Oberflächenbehan determine LAD. F Fumiscope gas ana days after treatmer	<i>punctatum</i> were fumigated with su inutes at 17.4 °C and 46 % relative ia. Bioassays from laboratory pop ("Holzschutzmittel - Bestimmung er Anobium punctatum (De Geer) les Überlebens von Larven - Teil 1 dlung (Laboratoriumsverfahren)") umigant concentration was measur alyser. Mortality rate was evaluate nt.	lfuryl fluoride for e humidity in ulation according der vorbeugenden durch Beobachten : were tested to red using a ed 89 days and 228
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordance principles, possibly with incomple ficiencies, which do not affect the	ce with generally ete reporting or quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this is high level of contr Additional trials ha the dose rates of th stage at different to	nvestigation was that under the det ol of <i>Anobium punctatum</i> eggs wa ave to be performed to understand be fumigant to achieve the LAD fo emperatures.	scribed conditions a s achieved. the variability of r this specific life
5.4	Conclusion	There are different wooden structures considered to be a efficacy of sulfury results showed tha pest species.	t life stages of <i>Anobium punctatum</i> . The laboratory fumigation test uvalid and effective procedure for each life on the eggs of <i>A. puncta</i> t sulfuryl fluoride was highly effective	e present in infested ndertaken was evaluating the <i>tum</i> . The efficacy ctive on eggs of this
5.5	Proposed efficacy specification	Control of eggs is 1695 g-h/m ³ at a te	excellent 99.90% mortality at the emperature of 17.4 °C and 46 % re	evaluated LAD of lative humidity.

	Evaluation by Competent Authorities
Date	EVALUATION BY RAPPORTEUR MEMBER STATE
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legends above the tables).
Summary and conclusion	Applicant's version is adopted.

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	2020.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) aluminium, $3 \times 2 \times 2 \text{ m} = 12 \text{ m}^3$, gas introduction via polyamide (PA) - lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 2020 eggs on ten boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").

Dow AgroSciences April 2004 RMS: Sweden

Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a digital scale. Gas was mixed as it was injected into the fumatorium using a fan inside the fumitorium.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 31.0 g/m^3 for a total exposure period of 54 hours and 45 minutes leading to an accumulated dosage of 1695 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 17.4 °C.
Moisture	Fumigation was conducted at an average 46 % relative humidity.

Section B5.10.2		Efficacy Data	
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/15 Anobium punctatum Laboratory study (Ref. Z15)	
		1 DEFEDENCE, 715 B5 10 2/15	Official
11	Reference	¹ REFERENCE: Z15, B5.10.2 /15 ¹ Binker G ⁻¹ Binker I ⁻¹ Eröba G ⁻² Graf E and ² I and B (1997)	use only
1.1	Kelefence	¹ Binker Materialschutz GmbH Westendstr 3 D-91207 Lauf Germany	
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.	
		Laboratory study on <i>Anobium punctatum</i> Number: 125749/C and 125749/E (Bioassay 161 – 180).	
1.2	Data protection	Yes.	
1.2.1	Data owner	Dow AgroSciences LLC.	
1.2.2	Companies with letter of Access	None.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I	
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.	
1.4	Deviations	Not applicable as the study not conducted to an international standard method.	
		2 METHOD	
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.	
2.1.1	Trade name/ proposed trade name	Vikane.	
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.	
2.1.3	Physical state and nature	Fumigant.	
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.	
2.1.5	Method of analysis	Not applicable.	
2.2	Reference substance	No reference substance was included in the study.	
2.2.1	Method of analysis for reference substance	Not applicable.	
2.3	Testing procedure		
2.3.1	Test population / inoculum / test organism	See Table 1.1.	

Dow A RMS	AgroSciences : Sweden	April 200	4 Vikane Doc	III-B5
Section B5.10.2 Efficacy Data Annex Point IIB5.10 TNsG: Pt. LB5.10 B5.10 2/15 Anobium punctatum				
Pt. III-	Ch. 6	Laborato	pry study (Ref. Z15)	
2.3.2	Test system	See Table 1	.2.	
2.3.3	Application of TS	See Table 1	.3.	
2.3.4	Test conditions	See Table 1	.4.	
2.3.5	Duration of the test / Exposure time	59 hours an	d 5 minutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated c same condi	ontrols were included; these were kept and stored under the tions as the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination			
2.4.1	Effect investigated	Lethal accu were detern treatment.	mulated dosage (LAD) expressed as $g-h/m^3$. Two effects nined – LAD 89 days after treatment and LAD 228 days after	
2.4.2	Method for recording / scoring of the effect	Egg-mortal eggs 89 day (i.e. 228 da	ity by examination (count) of larvae hatched from treated vs after treatment and survival of these larvae 139 days later ys after treatment).	
2.4.3	Intervals of examination	Larvae hate survival 22	hed from treated eggs 89 days after treatment and larvae 8 days after treatment.	
2.4.4	Statistics	Post fumiga number of a treatment a	ation mean total mortality was calculated by dividing the dead eggs by the total number of treated eggs 89 days after nd 228 days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RI	ESULTS	
3.1	Efficacy	The percent hatched and	tage mortality was calculated by dividing the total number of a surviving larvae by the total number of treated eggs.	Х

Percentage mortality of eggs of *Anobium punctatum* 89 days after exposure to sulfuryl fluoride.

exposure to suffury fluoride.					
A		Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae	
141	150	120	120	0	
142	91	87	87	0	
143	113	107	107	0	
144	101	99	99	0	
145	143	134	134	0	
146	438	427	427	0	
147	103	96	96	0	
148	135	126	126	0	
149	237	227	227	0	

150	107	92	92	0
total	1618	1515	1515	0

Total mortality of untreated eggs 6.37%.

В	Treated Eggs				
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae	
161	375	0	0	0	
162	286	7	7	0	
163	301	2	2	0	
164	104	1	1	0	
165	302	1	1	0	
166	170	0	0	0	
167	180	0	0	0	
168	281	1	1	0	
169	156	0	0	0	
170	365	3	3	0	
171	293	5	5	0	
172	247	0	0	0	
173	155	0	0	0	
174	175	0	0	0	
175	85	0	0	0	
176	271	3	3	0	
177	214	11	11	0	
178	177	3	3	0	
179	207	2	2	0	
180	181	4	4	0	
total	4525	43	43	0	

Total mortality of treated eggs: 99.05%.

Percentage mortality of eggs of Anobium punctatum 22	28 days after
exposure to sulfuryl fluoride.	

exposure to summify muorine.				
A	Untreated Control			
No.	Eggs	Larvae	Larvae	Larvae
		hatched	penetrated	survived
141	150	120	120	95
142	91	87	87	49
143	113	107	107	86
144	101	99	99	78
145	143	134	134	104
146	438	427	427	321
147	103	96	96	86
148	135	126	126	79
149	237	227	227	119
150	107	92	92	55
total	1618	1515	1515	1072

Total mortality of untreated eggs: 33.75%.

Dow AgroSciences April 2004 Vikane RMS: Sweden

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В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
161	375	0	0	0
162	286	7	7	0
163	301	2	2	0
164	104	1	1	0
165	302	1	1	0
166	170	0	0	0
167	180	0	0	0
168	281	1	1	0
169	156	0	0	0
170	365	3	3	0
171	293	5	5	0
172	247	0	0	0
173	155	0	0	0
174	175	0	0	0
175	85	0	0	0
176	271	3	3	2
177	214	11	11	2
178	177	3	3	0
179	207	2	2	0
180	181	4	4	0
total	4525	43	43	4

Total mortality of treated eggs: 99.91%.

Section B5.10.2		Efficacy Data			
Annex I TNsG: Pt. III-0	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/15 Anobium punctatum Laboratory study (Ref. Z15)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 99.05% was achieved 89 days after treatment and of 99.91% 228 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1. Precise conditions could be determined.			
	laboratory testing	2. Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions	Not applicable.			
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Eggs are considered to be the stage which would require a higher dose of sulfuryl			

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/15 An Laboratory st	obium punctatum udy (Ref. Z15)	
		fluoride compared	l to the other stages.	
4.3.3	Observed effect	The high mortality the desired field represented	y effect, recorded in the laboratory te esponse for eradication of eggs of An	est is considered as about the second s
4.4	Relevance for read-across	Not applicable.		
		5 APPLIC	CANT'S SUMMARY AND CONCI	LUSION
5.1	Materials and methods	Eggs of <i>Anobium</i> 59 hours and 5 mi laboratory fumitor to EN 49.1 (1992) Wirkung gegenüb der Eiablage und Oberflächenbehar determine LAD. F Fumiscope gas an days after treatme	<i>punctatum</i> were fumigated with sulf inutes at 17.4 °C and 46 % relative hu ria. Bioassays from laboratory popul) ("Holzschutzmittel - Bestimmung d ber Anobium punctatum (De Geer) du des Überlebens von Larven - Teil 1: ndlung (Laboratoriumsverfahren)") w Fumigant concentration was measure alyser. Mortality rate was evaluated int.	uryl fluoride for umidity in lation according ler vorbeugenden urch Beobachten vere tested to d using a 89 days and 228
5.2	Reliability	Reliability indicat accepted scientific methodological do results.	tor 2: Study conducted in accordance c principles, possibly with incomplet eficiencies, which do not affect the q	with generally e reporting or uality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this high level of contr Additional trials h the dose rates of t stage at different t	investigation was that under the desc rol of <i>Anobium punctatum</i> eggs was have to be performed to understand the he fumigant to achieve the LAD for the temperatures.	ribed conditions a achieved. he variability of this specific life
5.4	Conclusion	There are differen wooden structures considered to be a efficacy of sulfury results showed tha pest species.	It life stages of <i>Anobium punctatum</i> p s. The laboratory fumigation test und a valid and effective procedure for ev yl fluoride on the eggs of <i>A. punctatu</i> at sulfuryl fluoride was highly effection	bresent in infested dertaken was aluating the <i>m</i> . The efficacy tive on eggs of this
5.5	Proposed efficacy specification	Control of eggs is 1830 g-h/m ³ at a t humidity.	excellent 99.91% mortality at the even perature of 17.4 °C and a moistur	valuated LAD of e of 46 % relative

	Evaluation by Competent Authorities		
	EVALUATION BY RAPPORTEUR MEMBER STATE		
Date	October 2004.		
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions durin fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.		
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legends above the tables).		
Summary and conclusion	Applicant's version is adopted.		

1.1 Test organisms - Anobium punctatum

Criteria	Details		
Family	Anobiidae.		
Species	Anobium punctatum.		
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").		
Life stage	Eggs.		
Mixed age population	Not applicable.		
Number of eggs in test	4525.		

1.2 Test system

Criteria	Details	
Test chamber	Fumitoria (fumigation chambers) aluminium, $3 \ge 2 \ge 2$ 2 m = 12 m ³ , gas introduction via polyamide (PA) - lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.	
Test insects introduction into chamber	In total 4525 eggs on twenty boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").	

Dow AgroSciences April 2004 RMS: Sweden

Measuring equipment	Gas concentrations were verified upon initiation
neusuing equipment	periodically during fumigation and upon termination
	using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details	
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the fumitorium in its gaseous form.	
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a digital scale. Gas was mixed as it was injected into the fumatorium using a fan inside the fumitorium.	
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 31.0 g/m^3 for a total exposure period of 59 hours and 5 minutes leading to an accumulated dosage of 1830 g-h/m ³ .	

1.4 Test conditions

Criteria	Details		
Incubation temperature	Fumigation was conducted at an average temperature of 17.4 °C.		
Moisture	Fumigation was conducted at an average 46 % relative humidity.		

Section B5.10.2		Efficacy Data				
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/16 Anobium punctatum Laboratory study (Ref. Z16)				
			Official			
		1 REFERENCE: Z16, B5.10.2/16	use only			
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1997).				
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany				
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.				
		Laboratory study on <i>Anobium punctatum</i> Number: 125749/C and 125749/E (Bioassay 181 – 200).				
1.2	Data protection	Yes.				
1.2.1	Data owner	Dow AgroSciences LLC.				
1.2.2	Companies with letter of Access	None.				
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I				
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.				
1.4	Deviations	Not applicable as the study not conducted to an international standard method.				
		2 METHOD				
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.				
2.1.1	Trade name/ proposed trade name	Vikane.				
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.				
2.1.3	Physical state and nature	Fumigant.				
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.				
2.1.5	Method of analysis	Not applicable.				
2.2	Reference substance	No reference substance was included in the study.				
2.2.1	Method of analysis for reference substance	Not applicable.				
2.3	Testing procedure					
2.3.1	Test population / inoculum / test organism	See Table 1.1.				

Dow A RMS	AgroSciences Sweden	April 20	04 Vikane Doc	III-B5
Sectio	on B5.10.2	Efficacy	y Data	
Annex TNsG: Pt. III-	Annex Point IIB5.10TNsG: Pt. I-B5.10,Pt. III-Ch. 6B5.10.2/16 Anobium punctatumLaboratory study (Ref. Z16)			
2.3.2	Test system	See Table	1.2.	
2.3.3	Application of TS	See Table	1.3.	
2.3.4	Test conditions	See Table	1.4.	
2.3.5	Duration of the test / Exposure time	62 hours a	and 57 minutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated same conc	controls were included, these were kept and stored under the litions as the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination			
2.4.1	Effect investigated	Lethal acc were deter treatment.	cumulated dosage (LAD) expressed as g-h/m ³ . Two effects rmined – LAD 89 days after treatment and LAD 228 days after	
2.4.2	Method for recording / scoring of the effect	Egg-morta eggs 89 da (i.e. 228 d	ality by examination (count) of larvae hatched from treated ays after treatment and surving of these larvae 139 days later ays after treatment).	
2.4.3	Intervals of examination	Larvae ha survival 2	tched from treated eggs 89 days after treatment and larvae 28 days after treatment.	
2.4.4	Statistics	Post fumig number of treatment	gation mean total mortality was calculated by dividing the f dead eggs by the total number of treated eggs 89 days after and 228 days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 F	RESULTS	
3.1	Efficacy	The perce hatched an	ntage mortality was calculated by dividing the total number of nd surviving larvae by the total number of treated eggs.	Х

exposure to summing muorine.					
А	Untreated Control				
No.	Eggs	Larvae	Larvae	Dead larvae	
		hatched	penetrated		
141	150	120	120	0	
142	91	87	87	0	
143	113	107	107	0	
144	101	99	99	0	
145	143	134	134	0	
146	438	427	427	0	
147	103	96	96	0	
148	135	126	126	0	
149	237	227	227	0	
150	107	92	92	0	
total	1618	1515	1515	0	

Percentage mortality of eggs of *Anobium punctatum* 89 days after exposure to sulfuryl fluoride.

Total mortality of untreated eggs 6.37%.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
181	152	0	0	0
182	227	3	3	0
183	359	2	2	0
184	242	0	0	0
185	200	1	1	0
186	196	4	4	0
187	316	1	1	0
188	203	0	0	0
189	228	0	0	0
190	215	0	0	0
191	346	14	14	0
192	229	1	1	0
193	264	0	0	0
194	251	1	1	0
195	282	6	6	0
196	291	1	1	0
197	90	1	1	0
198	289	5	5	0
199	255	6	6	0
200	213	3	3	0
total	4848	49	49	0

Total mortality of treated eggs: 98.99%.
exposure to summing muorine.					
А		Untreated Control			
No.	Eggs	Larvae	Larvae	Larvae	
		hatched	penetrated	survived	
141	150	120	120	95	
142	91	87	87	49	
143	113	107	107	86	
144	101	99	99	78	
145	143	134	134	104	
146	438	427	427	321	
147	103	96	96	86	
148	135	126	126	79	
149	237	227	227	119	
150	107	92	92	55	
total	1618	1515	1515	1072	

Percentage mortality of eggs of *Anobium punctatum* 228 days after exposure to sulfuryl fluoride.

Total mortality of untreated eggs: 33.75%.

В		Treate	d Eggs	
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
181	152	0	0	0
182	227	3	3	0
183	359	2	2	0
184	242	0	0	0
185	200	1	1	1
186	196	4	4	0
187	316	1	1	0
188	203	0	0	0
189	228	0	0	0
190	215	0	0	0
191	346	14	14	0
192	229	1	1	0
193	264	0	0	0
194	251	1	1	0
195	282	6	6	0
196	291	1	1	0
197	90	1	1	0
198	289	5	5	0
199	255	6	6	1
200	213	3	3	1
total	4848	49	49	3

Total mortality of treated eggs: 99.94%.

Dow RMS	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Section	on B5.10.2	Efficacy Data		
Annex TNsG Pt. III	: Point IIB5.10 : Pt. I-B5.10, -Ch. 6	B5.10.2/16 Anobium punctatum Laboratory study (Ref. Z16)		
3.1.1	Dose/Efficacy curve	Not available from re	eport.	
3.1.2	Begin and duration of effects	A mortality of 98.99 99.94% 228 days afte	% was achieved 89 days after trea er treatment.	atment and of
3.1.3	Observed effects in the post monitoring phase	No unusual effect ob	served.	
3.2	Effects against organisms or objects to be protected	None reported.		
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	No reference substan	ice was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEVAN FIELD CO	ICE OF THE RESULTS COM NDITIONS	PARED TO
4.1	Reasons for	1 Precise condit	tions could be determined.	
	laboratory testing	2 Practical, accu	urate procedure.	
		Data generated is con obtained from the fie	nsidered relevant for field of use. Ad.	Test insects
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions			
4.3.1	Application method	The principle of fum sufficient period of ti target pest. There are to achieve this althou	igation is to confine a sufficient c ime to enable a toxic dose to be re e a number of ways in laboratory igh the principle is the same.	concentration for a eceived by the and field studies
4.3.2	Test organism	There are different li considered to be the	fe stages of <i>Anobium punctatum</i> . stage which would require a high	Eggs are er dose of sulfuryl

Dow A RMS:	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Sectio Annex	on B5.10.2 Point IIB5.10	Efficacy Data		
TNsG: Pt. III-	Pt. I-B5.10, Ch. 6	B5.10.2/16 Ano Laboratory stu	bium punctatum dy (Ref. Z16)	
4.3.3	Observed effect	fluoride compared t The high mortality the desired field res <i>punctatum</i> .	to the other stages. effect, recorded in the laboratory ponse for eradication of eggs of	test is considered as Anobium
4.4	Relevance for read-across	Not applicable.		
		5 APPLICA	NT'S SUMMARY AND CON	CLUSION
5.1	Materials and methods	Eggs of Anobium pa 62 hours and 57 min laboratory fumitoria to EN 49.1 (1992) (Wirkung gegenüber der Eiablage und de Oberflächenbehand determine LAD. Fu Fumiscope gas anal days after treatment	<i>unctatum</i> were fumigated with s nutes at 17.7 °C and 46 % relativ a. Bioassays from laboratory po "Holzschutzmittel - Bestimmun r Anobium punctatum (De Geer) es Überlebens von Larven - Teil lung (Laboratoriumsverfahren)" migant concentration was measu yser. Mortality rate was evaluat	ulfuryl fluoride for ve humidity in pulation according g der vorbeugenden o durch Beobachten 1:) were tested to ured using a ted 89 days and 228
5.2	Reliability	Reliability indicator accepted scientific j methodological def results.	r 2: Study conducted in accordar principles, possibly with incomp iciencies, which do not affect the	nce with generally lete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this in high level of contro Additional trials ha the dose rates of the stage at different ter	vestigation was that under the de l of <i>Anobium punctatum</i> eggs w ve to be performed to understand e fumigant to achieve the LAD for mperatures.	escribed conditions a as achieved. d the variability of or this specific life
5.4	Conclusion	There are different wooden structures. considered to be a v efficacy of sulfuryl results showed that pest species.	life stages of <i>Anobium punctatur</i> . The laboratory fumigation test trailed and effective procedure for fluoride on the eggs of <i>A. puncta</i> sulfuryl fluoride was highly effect	<i>n</i> present in infested undertaken was evaluating the <i>atum</i> . The efficacy ective on eggs of this
5.5	Proposed efficacy specification	Control of eggs is e 1951 g-h/m ³ at a ter humidity.	xcellent 99.91% mortality at the nperature of 17.7 °C and a mois	evaluated LAD of ture of 46 % relative

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legends above the tables).
Summary and conclusion	Applicant's version is accepted.

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	4848.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) aluminium, $3 \ge 2 \ge 2$ 2 m = 12 m ³ , gas introduction via polyamide (PA) - lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 4848 eggs on twenty boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").

Dow AgroSciences April 2004 RMS: Sweden

Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Eumiscope gas analyser
	using a runnscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a digital scale. Gas was mixed as it was injected into the fumatorium using a fan inside the fumitorium.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 31.0 g/m^3 for a total exposure period of 62 hours and 57 minutes leading to an accumulated dosage of 1951 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 17.7 °C.
Moisture	Fumigation was conducted at an average 46 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex TNsG: Pt. III-	Annex Point IIB5.10TNsG: Pt. I-B5.10,Pt. III-Ch. 6B5.10.2/17 Anobium punctatumField study (Ref. Z17)				
			Official		
	D 4	1 REFERENCE: Z17, B5.10.2/17	use only		
1.1	Reference	Binker, G., Binker, J., Fröba G., Graf, E. and Lanz, B (2000).			
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.			
		Laboratory study on <i>Anobium punctatum</i> Number: 402741/A and 402741/B (Bioassay 1 – 60).	Х		
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow A	AgroSciences : Sweden	April 2004	4 Vikane Doc	III-B5
Section Annex TNsG:	on B5.10.2 Point IIB5.10 Pt. I-B5.10,	Efficacy	Data 7 Anobium punctatum	
Pt. III-	•Ch. 6	Field stu	dy (Ref. Z17)	
	test organism			
2.3.2	Test system	See Table 1	.2.	
2.3.3	Application of TS	See Table 1	.3.	
2.3.4	Test conditions	See Table 1	.4.	
2.3.5	Duration of the test / Exposure time	72 hours an	d 25 minutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated c same condi	ontrols were included; these were kept and stored under the tions as the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination			
2.4.1	Effect investigated	Lethal accu were detern treatment.	mulated dosage (LAD) expressed as g-h/m ³ . Two effects nined – LAD 90 days after treatment and LAD 221 days after	
2.4.2	Method for recording / scoring of the effect	Egg-mortal eggs 90 day (i.e. 221 day	ity by examination (count) of larvae hatched from treated vs after treatment and survival of these larvae 131 days later ys after treatment).	
2.4.3	Intervals of examination	Larvae hatc survival 22	whed from treated eggs 90 days after treatment and larvae 1 days after treatment.	
2.4.4	Statistics	Post fumiga number of o treatment a	ation mean total mortality was calculated by dividing the dead eggs by the total number of treated eggs 90 days after nd 221 days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RI	ESULTS	
3.1	Efficacy	The percent hatched and	tage mortality was calculated by dividing the total number of a surviving larvae by the total number of treated eggs.	Х

exposure to summing muorite.				
А	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
1	83	80	80	0
2	241	233	233	0
3	81	74	74	0
4	119	115	115	0
5	60	58	58	0
6	105	95	95	0
7	98	96	96	0
8	54	54	54	0
9	54	53	53	0
10	136	133	133	0
total	1031	991	991	0

Percentage mortality of eggs of *Anobium punctatum* 90 days after exposure to sulfuryl fluoride.

Total mortality of untreated eggs 3.88 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
11	138	0	0	0
12	220	0	0	0
13	71	1	1	0
14	205	0	0	0
15	187	0	0	0
16	199	0	0	0
17	273	1	1	0
18	228	0	0	0
19	241	0	0	0
20	96	0	0	0
21	91	0	0	0
22	198	0	0	0
23	223	0	0	0
24	105	0	0	0
25	152	0	0	0
26	85	0	0	0
27	197	0	0	0
28	163	0	0	0
34	219	0	0	0
35	191	0	0	0
36	158	0	0	0
37	211	0	0	0
38	131	0	0	0
39	158	0	0	0
40	93	2	2	0
41	234	4	4	0
42	157	0	0	0
43	319	1	1	0
44	104	0	0	0

Dow AgroSciencesApril 2004VikaneDoc III-B5RMS: Sweden

45	232	0	0	0
46	281	2	2	0
47	95	0	0	0
48	106	0	0	0
49	60	0	0	0
50	118	1	1	0
51	108	0	0	0
52	175	0	0	0
53	88	0	0	0
54	128	2	2	0
55	266	0	0	0
56	201	0	0	0
57	207	1	1	0
58	223	1	1	0
59	249	0	0	0
60	214	0	0	0
total	7798	16	16	0

Total mortality of treated eggs: 99.79 %.

Percentage mortality of eggs of *Anobium punctatum* 221 days after exposure to sulfuryl fluoride.

A		Untreate	d Control	
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
1	83	80	80	78
2	241	233	233	198
3	81	74	74	74
4	119	115	115	109
5	60	58	58	58
6	105	95	95	93
7	98	96	96	95
8	54	54	54	54
9	54	53	53	53
10	136	133	133	127
total	1031	991	991	939

Total mortality of untreated eggs: 8.92 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
11	138	0	0	0
12	220	0	0	0
13	71	1	1	0
14	205	0	0	0
15	187	0	0	0
16	199	0	0	0
17	273	1	1	0
18	228	0	0	0

Dow AgroS RMS: Swed	ciences len	April 2004		Vikane
19	241	0	0	0
20	96	0	0	0
21	91	0	0	0
22	198	0	0	0
23	223	0	0	0
24	105	0	0	0
25	152	0	0	0
26	85	0	0	0
27	197	0	0	0
28	163	0	0	0
34	219	0	0	0
35	191	0	0	0
36	158	0	0	0
37	211	0	0	0
38	131	0	0	0
39	158	0	0	0
40	93	2	2	0
41	234	4	4	0
42	157	0	0	0
43	319	1	1	0
44	104	0	0	0
45	232	0	0	0
46	281	2	2	0
47	95	0	0	0
48	106	0	0	0
49	60	0	0	0
50	118	1	1	0
51	108	0	0	0
52	175	0	0	0
53	88	0	0	0
54	128	2	2	0
55	266	0	0	0
56	201	0	0	0
57	207	1	1	0
58	223	1	1	0
59	249	0	0	0
60	214	0	0	0
total	7798	16	16	0

Doc III-B5

Total mortality of treated eggs: 100 %.

Section B5.10.2		Efficacy Data	
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/17 Anobium punctatum Field study (Ref. Z17)	
3.1.1	Dose/Efficacy curve	Not available from report.	
3.1.2	Begin and duration of effects	A mortality of 99.79 % was achieved 90 days after treatment and of 100 % 221 days after treatment.	
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.	
3.2	Effects against organisms or objects to be protected	None reported.	
3.3	Other effects	None reported.	
3.4	Efficacy of the reference substance	No reference substance was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.	
3.6	Efficacy limiting factors		
3.6.1	Occurrences of resistances	None reported.	
3.6.2	Other limiting factors	None reported.	
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS	
4.1	Reasons for laboratory testing	Not applicable.	
4.2	Intended actual scale of biocide application	Not applicable.	
4.3	Relevance compared to field conditions	Not applicable.	
4.3.1	Application method	Not applicable.	
4.3.2	Test organism	Not applicable.	
4.3.3	Observed effect	Not applicable.	
4.4	Relevance for read-across	Not applicable.	

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio Annex TNsG: Pt. III-	on B5.10.2 Point IIB5.10 Pt. I-B5.10, Ch. 6	Efficacy Data B5.10.2/17 Ano Field study (Re	obium punctatum ef. Z17)	
		5 APPLICA	ANT'S SUMMARY AND CON	CLUSION
5.1	Materials and methods	Eggs of Anobium p 72 hours and 25 mi condition (church of population accordin Bestimmung der vo punctatum (De Gee Überlebens von La (Laboratoriumsver concentration was) rate was evaluated	<i>bunctatum</i> were fumigated with spinutes at 19.1 °C in a practical function of a volume of 460 m ³). Bioassaying to EN 49.1 (1992) ("Holzschurberbeugenden Wirkung gegenüber er) durch Beobachten der Eiablag rven - Teil 1: Oberflächenbehand fahren)") were tested to determinist measured using a Fumiscope gas 90 days and 221 days after treatment.	ulfuryl fluoride for migation under field /s from laboratory tzmittel - Anobium e und des llung e LAD. Fumigant analyser. Mortality nent.
5.2	Reliability	Reliability indicato accepted scientific methodological def results.	or 2: Study conducted in accordan principles, possibly with incomp ficiencies, which do not affect the	ice with generally lete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this ir high level of contro Additional trials ha the dose rates of th stage at different te	nvestigation was that under the de of of <i>Anobium punctatum</i> eggs was twe to be performed to understand e fumigant to achieve the LAD for emperatures.	escribed conditions a as achieved. I the variability of or this specific life
5.4	Conclusion	There are different wooden structures. to be a valid and ef sulfuryl fluoride or showed that sulfury species.	life stages of <i>Anobium punctatur</i> The field fumigation test undert fective procedure for evaluating a the eggs of <i>A. punctatum</i> . The or yl fluoride was highly effective o	<i>n</i> present in infested aken was considered the efficacy of efficacy results n eggs of this pest
5.5	Proposed efficacy specification	Control of eggs is e 2237 g-h/m ³ at a te	excellent 100 % mortality at the emperature of 19.1 °C and 79 % r	evaluated LAD of elative humidity.

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 1.1. Second last line should read: Field study on Anobium punctatum
	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legends above the tables).
Summary and conclusion	Applicant's version is adopted.

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	7798.

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 460 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 7881 eggs on 45 boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan positioned in the structure.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 30.9 g/m^3 for a total exposure period of 72 hours and 25 minutes leading to an accumulated dosage of 2237 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 19.1 °C.
Moisture	Fumigation was conducted at an average 79 % relative humidity.

Section B5.10.2		Efficacy Data				
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/18 Anobium punctatum Field study (Ref. Z18)				
			066 • 1			
		1 REFERENCE: Z18, B5.10.2/18	Ufficial use only			
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (2000).				
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany				
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.				
		Field study on <i>Anobium punctatum</i> Number: 402741/A and 402741/B (Bioassay 61 – 120).				
1.2	Data protection	Yes.				
1.2.1	Data owner	Dow AgroSciences LLC.				
1.2.2	Companies with letter of Access	None.				
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I				
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.				
1.4	Deviations	Not applicable as the study not conducted to an international standard method.				
		2 METHOD				
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.				
2.1.1	Trade name/ proposed trade name	Vikane.				
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.				
2.1.3	Physical state and nature	Fumigant.				
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.				
2.1.5	Method of analysis	Not applicable.				
2.2	Reference substance	No reference substance was included in the study.				
2.2.1	Method of analysis for reference substance	Not applicable.				
2.3	Testing procedure					
2.3.1	Test population / inoculum /	See Table 1.1.				

Dow RMS	Dow AgroSciencesApril 2004VikaneDocRMS: Sweden		Doc I	II-B5	
Sectio	on B5.10.2	Efficacy Data			
Annex TNsG: Pt. III	Point IIB5.10 Pt. I-B5.10, •Ch. 6	B5.10.2/18 Anob Field study (Ref	bium punctatum . Z18)		
	test organism				
2.3.2	Test system	See Table 1.2.			
2.3.3	Application of TS	See Table 1.3.			
2.3.4	Test conditions	See Table 1.4.			
2.3.5	Duration of the test / Exposure time	72 hours and 25 min	utes.		
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	Untreated controls w same conditions as the second	rere included, these were kept and stored ne treated eggs of <i>Anobium punctatum</i> .	d under the	Х
2.4	Examination				
2.4.1	Effect investigated	Lethal accumulated of were determined – L treatment.	dosage (LAD) expressed as g-h/m ³ . Tw AD 90 days after treatment and LAD 22	o effects 21 days after	
2.4.2	Method for recording / scoring of the effect	Egg-mortality by exa eggs 90 days after tro (i.e. 221 days after tr	amination (count) of larvae hatched from eatment and survival of these larvae 131 eatment).	n treated days later	
2.4.3	Intervals of examination	Larvae hatched from survival 221 days aft	treated eggs 90 days after treatment and the treatment.	d larvae	
2.4.4	Statistics	Post fumigation mea number of dead eggs treatment and 221 da	n total mortality was calculated by divid by the total number of treated eggs 90 on sys after treatment.	ling the days after	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.			
		3 RESULTS			
3.1	Efficacy	The percentage mort hatched and survivin	ality was calculated by dividing the tota g larvae by the total number of treated ϵ	l number of eggs.	Х

Percentage mortality of eggs of *Anobium punctatum* 90 days after exposure to sulfuryl fluoride.

exposure to suffury fluoride.				
А		Untreate	d Control	
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
61	92	90	90	0
62	201	190	190	0
63	292	262	262	0
64	143	93	93	0
65	182	180	180	0
66	85	80	80	0

Dow AgroSciences April 2004 Vikane RMS: Sweden

67	64	60	60	0
68	162	154	154	0
69	52	35	35	0
70	69	57	57	0
total	1342	1201	1201	0

Total mortality of untreated eggs 10.51 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
71	136	0	0	0
72	126	0	0	0
73	307	44	44	0
74	95	1	1	0
75	123	0	0	0
76	65	1	1	0
77	84	1	1	0
78	70	0	0	0
79	147	0	0	0
80	211	0	0	0
81	231	0	0	0
82	118	0	0	0
83	143	0	0	0
84	215	0	0	0
85	166	0	0	0
86	246	0	0	0
87	321	0	0	0
88	61	0	0	0
89	155	0	0	0
90	190	0	0	0
91	87	0	0	0
92	240	2	2	0
93	109	0	0	0
94	77	0	0	0
95	91	0	0	0
96	162	0	0	0
102	126	0	0	0
103	78	0	0	0
104	193	0	0	0
105	133	0	0	0
106	144	0	0	0
107	87	0	0	0
108	140	0	0	0
109	143	0	0	0
110	78	0	0	0
111	167	0	0	0
112	104	0	0	0
113	228	1	1	0
114	149	0	0	0
115	98	0	0	0

Dow AgroSciences April 2004 RMS: Sweden

116	81	0	0	0
117	76	0	0	0
118	191	0	0	0
119	84	0	0	0
120	222	0	0	0
total	6498	50	50	0

Vikane

Total mortality of treated eggs: 99.23 %.

exposure to suffury fluoride.					
A		Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived	
61	92	90	90	87	
62	201	190	190	158	
63	292	262	262	249	
64	143	93	93	90	
65	182	180	180	175	
66	85	80	80	79	
67	64	60	60	60	
68	162	154	154	151	
69	52	35	35	35	
70	69	57	57	57	
total	1342	1201	1201	1141	

Percentage mortality of eggs of *Anobium punctatum* 221 days after exposure to sulfuryl fluoride.

Total mortality of untreated eggs: 14.98%.

В		Treate	d Eggs	
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
71	136	0	0	0
72	126	0	0	0
73	307	44	44	0
74	95	1	1	0
75	123	0	0	0
76	65	1	1	0
77	84	1	1	0
78	70	0	0	0
79	147	0	0	0
80	211	0	0	0
81	231	0	0	0
82	118	0	0	0
83	143	0	0	0
84	215	0	0	0
85	166	0	0	0
86	246	0	0	0
87	321	0	0	0
88	61	0	0	0
89	155	0	0	0
90	190	0	0	0

Dow AgroSciences RMS: Sweden		April 2004		Vikane	
91	87	0	0	0	
92	240	2	2	0	
93	109	0	0	0	
94	77	0	0	0	
95	91	0	0	0	
96	162	0	0	0	
102	126	0	0	0	
103	78	0	0	0	
104	193	0	0	0	
105	133	0	0	0	
106	144	0	0	0	
107	87	0	0	0	
108	140	0	0	0	
109	143	0	0	0	
110	78	0	0	0	
111	167	0	0	0	
112	104	0	0	0	
113	228	1	1	0	
114	149	0	0	0	
115	98	0	0	0	
116	81	0	0	0	
117	76	0	0	0	
118	191	0	0	0	
119	84	0	0	0	
120	222	0	0	0	
total	6498	50	50	0	

Doc III-B5

Total mortality of treated eggs: 100 %.

Sectio	n B5.10.2	Efficacy Data	
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/18 Anobium punctatum Field study (Ref. Z18)	
3.1.1	Dose/Efficacy curve	Not available from report.	
3.1.2	Begin and duration of effects	A mortality of 99.23 % was achieved 90 days after treatment and of 100% 221 days after treatment.	
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.	
3.2	Effects against organisms or objects to be protected	None reported.	
3.3	Other effects	None reported.	
3.4	Efficacy of the reference substance	No reference substance was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.	
3.6	Efficacy limiting factors		
3.6.1	Occurrences of resistances	None reported.	
3.6.2	Other limiting factors	None reported.	
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS	
4.1	Reasons for laboratory testing	Not applicable.	
4.2	Intended actual scale of biocide application	Not applicable.	
4.3	Relevance compared to field conditions	Not applicable.	
4.3.1	Application method	Not applicable.	
4.3.2	Test organism	Not applicable.	
4.3.3	Observed effect	Not applicable.	
4.4	Relevance for read-across	Not applicable.	

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio Annex TNsG: Pt. III-	on B5.10.2 Point IIB5.10 Pt. I-B5.10, Ch. 6	Efficacy Data B5.10.2/18 Ano Field study (Re	bium punctatum f. Z18)	
		5 APPLICA	ANT'S SUMMARY AND CONC	LUSION
5.1	Materials and methods	Eggs of Anobium p 72 hours and 25 mi condition (church o population accordin Bestimmung der vo punctatum (De Gee Überlebens von Lat (Laboratoriumsverf concentration was n rate was evaluated	<i>unctatum</i> were fumigated with sub nutes at 19.1 °C in a practical fum of a volume of 460 m ³). Bioassays ng to EN 49.1 (1992) ("Holzschutz orbeugenden Wirkung gegenüber A er) durch Beobachten der Eiablage rven - Teil 1: Oberflächenbehandl fahren)") were tested to determine measured using a Fumiscope gas a 90 days and 221 days after treatme	Ifuryl fluoride for iigation under field from laboratory zmittel - Anobium a und des ung e LAD. Fumigant inalyser. Mortality ent.
5.2	Reliability	Reliability indicato accepted scientific methodological def results.	r 2: Study conducted in accordance principles, possibly with incomple ficiencies, which do not affect the	e with generally ete reporting or quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this in high level of contro Additional trials ha the dose rates of the stage at different te	envestigation was that under the descent of <i>Anobium punctatum</i> eggs was very to be performed to understand e fumigant to achieve the LAD for mperatures.	scribed conditions a s achieved. the variability of t this specific life
5.4	Conclusion	There are different wooden structures. to be a valid and ef sulfuryl fluoride on showed that sulfury species.	life stages of <i>Anobium punctatum</i> The field fumigation test underta fective procedure for evaluating th the eggs of <i>A. punctatum</i> . The eff a fluoride was highly effective on	present in infested ken was considered he efficacy of fficacy results eggs of this pest
5.5	Proposed efficacy specification	Control of eggs is e 2237 g-h/m ³ at a ter	excellent 100 % mortality at the even perature of 19.1 °C and 79 % rel	valuated LAD of lative humidity.

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).
Summary and conclusion	Applicant's version is adopted.

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugender Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	6498.

1.1 Test organisms - Anobium punctatum

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 460 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 6498 eggs on fifty boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan positioned in the structure.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 30.9 g/m^3 for a total exposure period of 72 hours and 25 minutes leading to an accumulated dosage of 2237 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 19.1 °C.
Moisture	Fumigation was conducted at an average 79 % relative humidity.

Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/19 Anobium punctatum Laboratory study (Ref. Z19)				
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (2000).				
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany				
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.				
		Laboratory study on <i>Anobium punctatum</i> Number: 402741/C and 402741/D (Bioassay 143 – 165).				
1.2	Data protection	Yes.				
1.2.1	Data owner	Dow AgroSciences LLC.				
1.2.2	Companies with letter of Access	None.				
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I				
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.				
1.4	Deviations	Not applicable as the study not conducted to an international standard method.				
		2 METHOD				
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.				
2.1.1	Trade name/ proposed trade name	Vikane.				
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.				
2.1.3	Physical state and nature	Fumigant.				
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.				
2.1.5	Method of analysis	Not applicable.				
2.2	Reference substance	No reference substance was included in the study.				
2.2.1	Method of analysis for reference substance	Not applicable.				
2.3	Testing procedure					

Dow A RMS:	AgroSciences : Sweden	April 2004	Vikane Doc	III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/19 Ano Laboratory stu	bium punctatum dy (Ref. Z19)	
2.3.1	Test population / inoculum / test organism	/ See Table 1.1.		
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	67 hours and 30 mi	nutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls same conditions as	were included; these were kept and stored under the the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulated were determined – T	dosage (LAD) expressed as g-h/m ³ . Two effects LAD 84 days after treatment and LAD 227 days after	r
2.4.2	Method for recording / scoring of the effect	Egg-mortality by exercise eggs 84 days after t (i.e. 227 days after	camination (count) of larvae hatched from treated reatment and survival of these larvae 143 days later. treatment).	
2.4.3	Intervals of examination	Larvae hatched from survival 227 days a	n treated eggs 84 days after treatment and larvae fter treatment.	
2.4.4	Statistics	Post fumigation me number of dead egg treatment and 227 c	an total mortality was calculated by dividing the as by the total number of treated eggs 84 days after lays after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESULTS	5	
3.1	Efficacy	The percentage monopole hatched and survivi	rtality was calculated by dividing the total number of ng larvae by the total number of treated eggs.	X

Percentage mortality of eggs of *Anobium punctatum* 84 days after exposure to sulfuryl fluoride.

A		Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae	
131	117	103	103	0	
132	218	210	210	0	
133	196	189	189	0	
134	215	208	208	0	

Dow AgroSciences April 2004 Vikane RMS: Sweden

135	127	122	122	0
136	206	202	202	0
137	113	111	111	0
138	179	153	153	0
139	123	116	116	0
140	110	102	102	0
total	1604	1516	1516	0

Total mortality of untreated eggs 5.49 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
166	180	1	1	0
167	317	0	0	0
168	207	0	0	0
169	149	1	1	0
170	393	1	1	0
171	123	0	0	0
172	215	2	2	0
173	268	0	0	0
174	323	0	0	0
175	191	0	0	0
176	240	0	0	0
177	349	0	0	0
178	200	5	5	0
179	255	0	0	0
180	204	0	0	0
181	179	0	0	0
182	224	0	0	0
183	245	0	0	0
184	276	0	0	0
185	348	4	4	0
186	179	0	0	0
187	117	0	0	0
188	136	0	0	0
Total	5318	14	14	0

Total mortality of treated eggs: 99.74 %.

Percentage mortality of eggs of *Anobium punctatum* 227 days after exposure to sulfuryl fluoride.

exposure to summy muoride.					
A	Untreated Control				
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived	
131	117	103	103	100	
132	218	210	210	205	
133	196	189	189	185	
134	215	208	208	205	
135	127	122	122	120	
136	206	202	202	197	

Dow AgroSciences April 2004 Vikane RMS: Sweden

137	113	111	111	106
138	179	153	153	150
139	123	116	116	110
140	110	102	102	95
total	1604	1516	1516	1473

Total mortality of untreated eggs: 8.17 %.

В	Treated Eggs			
No.	Eggs	Eggs Larvae		Larvae
		hatched	penetrated	survived
143	214	0	0	0
144	183	0	0	0
145	281	0	0	0
146	190	0	0	0
147	204	0	0	0
148	292	1	1	0
149	117	0	0	0
150	182	0	0	0
151	257	0	0	0
152	409	0	0	0
153	250	0	0	0
154	219	0	0	0
155	187	0	0	0
156	151	0	0	0
157	218	0	0	0
158	231	0	0	0
159	418	0	0	0
160	228	0	0	0
161	158	0	0	0
162	252	0	0	0
163	235	0	0	0
164	326	0	0	0
165	138	0	0	0
Total	5340	1	1	0

Total mortality of treated eggs: 100 %.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/19 Anobium punctatum Laboratory study (Ref. Z19)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 99.98 % was achieved 84 days after treatment and of 100 % 227 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1 Precise conditions could be determined.			
	laboratory testing	2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in the laboratory and field studies to achieve this although the principle is the same.			
4.3.2 Test organism		There are different life stages of Anobium punctatum. Eggs are			

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2		Efficacy Data		
Annex TNsG: Pt. III-	Point 11B5.10 Pt. I-B5.10, Ch. 6	B5.10.2/19 And Laboratory stu	obium punctatum 1dy (Ref. Z19)	
		considered to be th fluoride compared	e stage which would require a hi to the other stages.	gher dose of sulfuryl
4.3.3	Observed effect	The high mortality the desired field re <i>punctatum</i> .	effect, recorded in the laboratory sponse for eradication of eggs of	y test is considered as <i>Anobium</i>
4.4	Relevance for read-across	Not applicable.		
		5 APPLIC	ANT'S SUMMARY AND CON	CLUSION
5.1	Materials and methods	Eggs of <i>Anobium p</i> 67 hours and 30 m from laboratory po "Holzschutzmittel Anobium punctatu Überlebens von La (Laboratoriumsver concentration was rate was evaluated	<i>bunctatum</i> were fumigated with s inutes at 21.3 °C in laboratory fur pulation according to EN 49.1 (1 - Bestimmung der vorbeugenden m (De Geer) durch Beobachten d rven - Teil 1: Oberflächenbehand fahren)") were tested to determin measured using a Fumiscope gas 84 days and 227 days after treatr	ulfuryl fluoride for mitoria. Bioassays 992) Wirkung gegenüber ler Eiablage und des dlung te LAD. Fumigant analyser. Mortality nent.
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordan principles, possibly with incomp ficiencies, which do not affect the	nce with generally lete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this in high level of contro- Additional trials ha the dose rates of th stage at different to	nvestigation was that under the dool of <i>Anobium punctatum</i> eggs wave to be performed to understander fumigant to achieve the LAD freemperatures.	escribed conditions a as achieved. d the variability of for this specific life
5.4	Conclusion	There are different wooden structures. to be a valid and et sulfuryl fluoride of showed that sulfur species.	life stages of <i>Anobium punctatur</i> . The field fumigation test under ffective procedure for evaluating a the eggs of <i>A. punctatum</i> . The yl fluoride was highly effective o	<i>m</i> present in infested taken was considered the efficacy of efficacy results n eggs of this pest
5.5	Proposed efficacy specification	Control of eggs is 1457 g-h/m ³ at a te	excellent 100 % mortality at the emperature of 21.3 °C.	evaluated LAD of

	Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	October 2004.	
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.	
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).	
	The content of the second table (examination of treated eggs after 84 days) is wrong and should be identical with the content of the last table but with a total mortality of: 99.98%.	
Summary and conclusion	Applicant's version is adopted.	

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	5340.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 5340 eggs on 23 boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der

Dow AgroSciencesApril 2004VikaneDoc III-B5RMS: Sweden

	Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 21.6 g/m ³ for a total exposure period of 67 hours and 30 minutes leading to an accumulated dosage of 1457 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 21.3 °C.
Moisture	Not available from report.

Section B5.10.2		Efficacy Data				
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/20 Anobium punctatum Laboratory study (Ref. Z20)				
		1 REFERENCE: Z20, B5.10.2/20	use only			
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (2000).				
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany				
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.				
		Laboratory study on <i>Anobium punctatum</i> Number: 402741/C and 402741/D (Bioassay 166 – 188).				
1.2	Data protection	Yes.				
1.2.1	Data owner	Dow AgroSciences LLC.				
1.2.2	Companies with letter of Access	None.				
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I				
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.				
1.4	Deviations	Not applicable as the study not conducted to an international standard method.				
		2 METHOD				
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.				
2.1.1	Trade name/ proposed trade name	Vikane.				
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.				
2.1.3	Physical state and nature	Fumigant.				
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.				
2.1.5	Method of analysis	Not applicable.				
2.2	Reference substance	No reference substance was included in the study.				
2.2.1	Method of analysis for reference substance	Not applicable.				
2.3	Testing procedure					
2.3.1	Test population / inoculum /	See Table 1.1.				

Dow A RMS	AgroSciences : Sweden	April 20	04 Vikane Doc	III-B5	
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy B5.10.2/	7 Data 720 Anobium punctatum tory study (Rof. 720)		
	test organism	Labora	Laboratory study (Rel. 220)		
2.3.2	Test system	See Table	1.2.		
2.3.3	Application of TS	See Table	1.3.		
2.3.4	Test conditions	See Table	1.4.		
2.3.5	Duration of the test / Exposure time	67 hours a	and 30 minutes.		
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	Untreated same cond	controls were included; these were kept and stored under the ditions as the treated eggs of <i>Anobium punctatum</i> .	Х	
2.4	Examination				
2.4.1	Effect investigated	Lethal acc were deten treatment.	cumulated dosage (LAD) expressed as g-h/m ³ . Two effects rmined – LAD 84 days after treatment and LAD 227 days after		
2.4.2	Method for recording / scoring of the effect	Egg-morta eggs 84 da (i.e. 227 d	ality by examination (count) of larvae hatched from treated ays after treatment and survival of these larvae 143 days later ays after treatment).		
2.4.3	Intervals of examination	Larvae ha survival 2	tched from treated eggs 84 days after treatment and larvae 27 days after treatment.		
2.4.4	Statistics	Post fumig number of treatment	gation mean total mortality was calculated by dividing the f dead eggs by the total number of treated eggs 84 days after and 227 days after treatment.		
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.			
		3 R	RESULTS		

3.1 Efficacy The percentage mortality was calculated by dividing the total number of hatched and surviving larvae by the total number of treated eggs.

Percentage mortality of eggs of *Anobium punctatum* 84 days after exposure to sulfuryl fluoride.

A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
131	117	103	103	0
132	218	210	210	0
133	196	189	189	0
134	215	208	208	0
135	127	122	122	0
136	206	202	202	0

Dow AgroSciences April 2004 Vikane RMS: Sweden

137	113	111	111	0
138	179	153	153	0
139	123	116	116	0
140	110	102	102	0
total	1604	1516	1516	0

Total mortality of untreated eggs 5.49 %.

В	Treated Eggs			
No.	Eggs	Larvae	Larvae	Dead larvae
		hatched	penetrated	
166	180	1	1	0
167	317	0	0	0
168	207	0	0	0
169	149	1	1	0
170	393	1	1	0
171	123	0	0	0
172	215	2	2	0
173	268	0	0	0
174	323	0	0	0
175	191	0	0	0
176	240	0	0	0
177	349	0	0	0
178	200	5	5	0
179	255	0	0	0
180	204	0	0	0
181	179	0	0	0
182	224	0	0	0
183	245	0	0	0
184	276	0	0	0
185	348	4	4	0
186	179	0	0	0
187	117	0	0	0
188	136	0	0	0
Total	5318	14	14	0

Total mortality of treated eggs: 99.74 %.

exposure to summing mustrue.				
A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
131	117	103	103	100
132	218	210	210	205
133	196	189	189	185
134	215	208	208	205
135	127	122	122	120
136	206	202	202	197
137	113	111	111	106
138	179	153	153	150

Percentage mortality of eggs of *Anobium punctatum* 227 days after exposure to sulfuryl fluoride.

Dow AgroSciences April 2004 Vikane RMS: Sweden

139	123	116	116	110
140	110	102	102	95
total	1604	1516	1516	1473

Total mortality of untreated eggs: 8.17 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
166	180	1	1	0
167	317	0	0	0
168	207	0	0	0
169	149	1	1	0
170	393	1	1	0
171	123	0	0	0
172	215	2	2	0
173	268	0	0	0
174	323	0	0	0
175	191	0	0	0
176	240	0	0	0
177	349	0	0	0
178	200	5	5	0
179	255	0	0	0
180	204	0	0	0
181	179	0	0	0
182	224	0	0	0
183	245	0	0	0
184	276	0	0	0
185	348	4	4	0
186	179	0	0	0
187	117	0	0	0
188	136	0	0	0
Total	5318	14	14	0

Total mortality of treated eggs: 100 %.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/20 Anobium punctatum Laboratory study (Ref. Z20)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 99.74 % was achieved 84 days after treatment and of 100 % 227 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for laboratory testing	1 Precise conditions could be determined.			
		2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions	Not applicable.			
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in the laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of Anobium punctatum. Eggs are			
Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5	
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Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/20 Anobium punctatum Laboratory study (Ref. 720)			
4.3.3	Observed effect	considered to be the stage which would require a higher dose of sulfuryl fluoride compared to the other stages. The high mortality effect recorded in the laboratory test is considered as		gher dose of sulfuryl y test is considered as	
44	Relevance for	the desired field re <i>punctatum</i> . Not applicable	sponse for eradication of eggs of	Anobium	
	read-across				
5.1	Materials and methods	5 APPLICA Eggs of <i>Anobium p</i> 67 hours and 30 m from laboratory po ("Holzschutzmittel gegenüber <i>Anobium</i> Eiablage und des U Oberflächenbehand determine LAD. F Fumiscope gas ana days after treatmer	ANT'S SUMMARY AND CON <i>punctatum</i> were fumigated with s inutes at 23.3 °C in laboratory fu pulation according to EN 49.1 (1 - Bestimmung der vorbeugende <i>n punctatum</i> (De Geer) durch Be Überlebens von Larven - Teil 1: dlung (Laboratoriumsverfahren)' 'umigant concentration was meas lyser. Mortality rate was evalua it.	sulfuryl fluoride for mitoria. Bioassays 1992) n Wirkung eobachten der ') were tested to sured using a ted 84 days and 227	
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordan principles, possibly with incomp ficiencies, which do not affect th	nce with generally blete reporting or e quality of relevant	
5.3	Assessment of efficacy, data analysis and interpretation	The result of this in high level of contro Additional trials ha the dose rates of th stage at different to	nvestigation was that under the d of of <i>Anobium punctatum</i> eggs w ave to be performed to understan- e fumigant to achieve the LAD f emperatures.	escribed conditions a vas achieved. d the variability of for this specific life	
5.4	Conclusion	There are different wooden structures. to be a valid and ef sulfuryl fluoride of showed that sulfur species.	life stages of <i>Anobium punctatu</i> . The field fumigation test under fective procedure for evaluating a the eggs of <i>A. punctatum</i> . The yl fluoride was highly effective of	<i>m</i> present in infested taken was considered the efficacy of efficacy results on eggs of this pest	
5.5	Proposed efficacy specification	Control of eggs is a 1880 g-h/m ³ at a te	excellent 100 % mortality at the mperature of 23.3 °C.	evaluated LAD of	

	Evaluation by Competent Authorities		
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.		
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.		
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).		
Summary and conclusion	Applicant's version is adopted.		

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	5318.

1.2 Test system

Criteria	Details	
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.	
Test insects introduction into chamber	In total 5318 eggs on 23 boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt	

Dow AgroSciences April 2004 RMS: Sweden

Vikane

	sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details	
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the fumitorium in its gaseous form.	
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.	
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 27.9 g/m ³ for a total exposure period of 67 hours and 30 minutes leading to an accumulated dosage of 1880 g-h/m ³ .	

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 23.3 °C.
Moisture	Not available from report.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/21 Anobium punctatum Laboratory study (Ref. Z21)			
		1 REFERENCE: Z21, B5.10.2/21	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.			
		Laboratory study on <i>Anobium punctatum</i> Number: $130377/A$ and 403972 (Bioassay $11 - 15$).			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow AgroSciences RMS: Sweden		April 2004	Vikane Do	c III-B5	
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/21 Anobium punctatum Laboratory study (Ref. Z21)			
	test organism				
2.3.2	Test system	See Table 1.2.			
2.3.3	Application of TS	See Table 1.3.			
2.3.4	Test conditions	See Table 1.4.			
2.3.5	Duration of the test / Exposure time	42 hours and 20 m	inutes.		
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	Untreated controls same conditions as	were included; these were kept and stored under the treated eggs of <i>Anobium punctatum</i> .	e X	
2.4	Examination				
2.4.1	Effect investigated	Lethal accumulate were determined – treatment.	d dosage (LAD) expressed as g-h/m ³ . Two effects LAD 88 days after treatment and LAD 228 days af	ter	
2.4.2	Method for recording / scoring of the effect	Egg-mortality by e eggs 88 days after (i.e. 228 days after	examination (count) of larvae hatched from treated treatment and survival of these larvae 140 days late treatment).	r	
2.4.3	Intervals of examination	Larvae hatched fro survival 228 days	om treated eggs 88 days after treatment and larvae after treatment.		
2.4.4	Statistics	Post fumigation m number of dead eg treatment and 228	ean total mortality was calculated by dividing the gs by the total number of treated eggs 88 days after days after treatment.		
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.			
		3 RESULT	'S		
3.1	Efficacy	The percentage monotonic terms of te	ortality was calculated by dividing the total number ing larvae by the total number of treated eggs.	of X	

Percentage mortality of eggs of *Anobium punctatum* 88 days after exposure to sulfuryl fluoride.

	exposure to summing mustice.						
A	Untreated Control						
No.	Eggs	Larvae	Larvae	Dead larvae			
		natched	penetrated				
1	153	150	150	0			
2	97	97	97	0			
3	88	88	88	0			
4	127	127	127	0			
5	98	96	96	0			
6	87	87	87	0			
7	100	100	100	0			

Dow AgroSciences April 2004 RMS: Sweden

8	88	88	88	0	
9	109	107	107	0	
10	123	122	122	0	
total	1070	1062	1062	0	

Vikane

Total mortality of untreated eggs 0.75 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
11	264	5	5	0
12	230	0	0	0
13	296	1	1	0
14	238	0	0	0
15	194	1	1	0
total	1222	7	7	0

Total mortality of treated eggs: 99.43 %.

Percentage mortality of eggs of *Anobium punctatum* 228 days after exposure to sulfuryl fluoride.

А		Untreate	d Control	
No.	Eggs	Larvae	Larvae	Larvae
1	153	150	150	150
1	07	07	07	100
2	97	97	97	97
3	88	88	88	88
4	127	127	127	127
5	98	96	96	95
6	87	87	87	87
7	100	100	100	98
8	88	88	88	85
9	109	107	107	99
10	123	122	122	109
total	1070	1062	1062	1035

Total mortality of untreated eggs: 3.27%.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
11	264	5	5	5
12	230	0	0	0
13	296	1	1	0
14	238	0	0	0
15	194	1	1	0
total	1222	7	7	5

Total mortality of treated eggs: 99.59 %.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/21 Anobium punctatum Laboratory study (Ref. Z21)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 99.43 % was achieved 88 days after treatment and of 99.59 % 228 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1 Precise conditions could be determined.			
	laboratory testing	2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions	Not applicable.			
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Eggs are considered to be the stage which would require a higher dose of sulfuryl			

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/21 And Laboratory stu	bbium punctatum 1dy (Ref. Z21)	
		fluoride compared	to the other stages.	
4.3.3	Observed effect	The high mortality the desired field re <i>punctatum</i> .	effect, recorded in the laboratory sponse for eradication of eggs of A	test is considered as Anobium
4.4	Relevance for read-across	Not applicable.		
		5 APPLIC	ANT'S SUMMARY AND CON	CLUSION
5.1	Materials and methods	Eggs of Anobium p 42 hours and 20 m laboratory fumitor EN 49.1 (1992) ("I Wirkung gegenübe der Eiablage und d Oberflächenbehand determine LAD. F Fumiscope gas ana days after treatmer	<i>punctatum</i> were fumigated with su inutes at 19.9 °C and 84 % relative ia Bioassays from laboratory pop Holzschutzmittel - Bestimmung de er <i>Anobium punctatum</i> (De Geer) of les Überlebens von Larven - Teil 1 dlung (Laboratoriumsverfahren)") fumigant concentration was measu ilyser. Mortality rate was evaluated tt.	alfuryl fluoride for e humidity in ulation according to er vorbeugenden durch Beobachten l: o were tested to irred using a ed 88 days and 228
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordan principles, possibly with incompl ficiencies, which do not affect the	ce with generally ete reporting or quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this in high level of contro Additional trials ha the dose rates of th stage at different to	nvestigation was that under the de ol of <i>Anobium punctatum</i> eggs wa ave to be performed to understand be fumigant to achieve the LAD for emperatures.	scribed conditions a s achieved. the variability of or this specific life
5.4	Conclusion	There are different wooden structures. considered to be a efficacy of sulfury results showed tha pest species.	life stages of <i>Anobium punctatum</i> . The laboratory fumigation test u valid and effective procedure for a fluoride on the eggs of <i>A. punctat</i> t sulfuryl fluoride was highly effected.	<i>n</i> present in infested indertaken was evaluating the <i>ntum</i> . The efficacy ctive on eggs of this
5.5	Proposed efficacy specification	Control of eggs is 1327 g-h/m ³ at a te humidity.	excellent 99.59 % mortality at the emperature of 19.9 °C and a moist	evaluated LAD of ure of 84 % relative

	Evaluation by Competent Authorities
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).
Summary and conclusion	Applicant's version is adopted.

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	1222.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, $40 \ge 25 \ge 14.5 \text{ cm} = 14.5$ litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 1222 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt

Dow AgroSciences April 2004 RMS: Sweden

Vikane

	sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 31.3 g/m^3 for a total exposure period of 42 hours and 20 minutes leading to an accumulated dosage of 1327 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 19.9 °C.
Moisture	Fumigation was conducted at an average 84 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/22 Anobium punctatum Laboratory study (Ref. Z22)			
		1 REFERENCE: Z22, B5.10.2/22	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.			
		Laboratory study on <i>Anobium punctatum</i> Number: $130377/A$ and 403972 (Bioassay $16 - 20$).			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane Doc	III-B5
Sectio	on B5.10.2	Efficacy Da	ta	
Annex Point IIB5.10TNsG: Pt. I-B5.10,Pt. III-Ch. 6B5.10.2/22 Anobium punctatumLaboratory study (Ref. Z22)				
	test organism			
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	42 hours and 1	5 minutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated contract same condition	rols were included; these were kept and stored under the s as the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination			
2.4.1	Effect investigated	Lethal accumul were determine treatment.	ated dosage (LAD) expressed as g-h/m ³ . Two effects $d - LAD 88$ days after treatment and LAD 228 days after	
2.4.2	Method for recording / scoring of the effect	Egg-mortality l eggs 88 days at (i.e. 228 days a	by examination (count) of larvae hatched from treated fter treatment and survival of these larvae 140 days later fter treatment).	
2.4.3	Intervals of examination	Larvae hatched survival 228 da	from treated eggs 88 days after treatment and larvae as after treatment.	
2.4.4	Statistics	Post fumigation number of dead treatment and 2	n mean total mortality was calculated by dividing the l eggs by the total number of treated eggs 88 days after 228 days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESU	ILTS	
3.1	Efficacy	The percentage hatched and sur	mortality was calculated by dividing the total number of rviving larvae by the total number of treated eggs.	Х

Percentage mortality of eggs of *Anobium punctatum* 88 days after exposure to sulfuryl fluoride.

exposure to summiff muorite.							
A	Untreated Control						
No.	Eggs	Larvae	Larvae	Dead larvae			
		natched	penetrated				
1	153	150	150	0			
2	97	97	97	0			
3	88	88	88	0			
4	127	127	127	0			
5	98	96	96	0			
6	87	87	87	0			
7	100	100	100	0			

Dow AgroSciences April 2004 RMS: Sweden

8	88	88	88	0
9	109	107	107	0
10	123	122	122	0
total	1070	1062	1062	0
$T_{abc} = 1$ and $T_{abc} = 1$ and $T_{abc} = 0.75$ 0/				

Vikane

Total mortality of untreated eggs 0.75 %.

В	Treated Eggs					
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae		
16	133	0	0	0		
17	293	1	1	0		
18	161	3	3	0		
19	243	1	1	0		
total	1101	9	9	0		

Total mortality of treated eggs: 99.18 %.

Percentage mortality of eggs of *Anobium punctatum* 228 days after exposure to sulfuryl fluoride.

A	Untreated Control					
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived		
1	153	150	150	150		
2	97	97	97	97		
3	88	88	88	88		
4	127	127	127	127		
5	98	96	96	95		
6	87	87	87	87		
7	100	100	100	98		
8	88	88	88	85		
9	109	107	107	99		
10	123	122	122	109		
total	1070	1062	1062	10352		

Total mortality of untreated eggs: 3.27 %.

В	Treated Eggs						
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived			
16	133	0	0	0			
17	293	1	1	0			
18	161	3	3	0			
19	243	1	1	0			
20	271	4	4	0			
total	1101	9	9	0			

Total mortality of treated eggs: 100 %.

Section B5.10.2		Efficacy Data					
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/22 Anobium punctatum Laboratory study (Ref. Z22)					
3.1.1	Dose/Efficacy curve	Not available from report.					
3.1.2	Begin and duration of effects	A mortality of 99.18 % was achieved 88 days after treatment and of 100 % 228 days after treatment.					
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.					
3.2	Effects against organisms or objects to be protected	None reported.					
3.3	Other effects	None reported.					
3.4	Efficacy of the reference substance	No reference substance was used.					
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.					
3.6	Efficacy limiting factors						
3.6.1	Occurrences of resistances	None reported.					
3.6.2	Other limiting factors	None reported.					
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS					
4.1	Reasons for	1 Precise conditions could be determined.					
	laboratory testing	2 Practical, accurate procedure.					
		Data generated is considered relevant for field of use. Test insects obtained from the field.					
4.2	Intended actual scale of biocide application	Not applicable.					
4.3	Relevance compared to field conditions						
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.					
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Eggs are considered to be the stage which would require a higher dose of sulfuryl					

Dow A RMS:	AgroSciences Sweden	April 2004 Vikane	Doc III-B5		
Sectio	on B5.10.2	Efficacy Data			
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/22 Anobium punctatum Laboratory study (Ref. Z22)			
		fluoride compared to the other stages.			
4.3.3	Observed effect	The high mortality effect, recorded in the laboratory test is considered as the desired field response for eradication of eggs of <i>Anobium punctatum</i> .			
4.4	Relevance for read-across	Not applicable.			
		5 APPLICANT'S SUMMARY AND C	CONCLUSION		
5.1	Materials and methods	Eggs of <i>Anobium punctatum</i> were fumigated wi 42 hours and 15 minutes at 20.6 °C and 83 % re laboratory fumitoria. Bioassays from laboratory to EN 49.1 (1992) ("Holzschutzmittel - Bestim Wirkung gegenüber <i>Anobium punctatum</i> (De G der Eiablage und des Überlebens von Larven - Oberflächenbehandlung (Laboratoriumsverfahr determine LAD. Fumigant concentration was n Fumiscope gas analyser. Mortality rate was eva days after treatment.	ith sulfuryl fluoride for elative humidity in y population according mung der vorbeugenden eer) durch Beobachten Teil 1: en)") were tested to neasured using a aluated 88 days and 228		
5.2	Reliability	Reliability indicator 2: Study conducted in acco accepted scientific principles, possibly with inc methodological deficiencies, which do not affec results.	ordance with generally omplete reporting or ct the quality of relevant		
5.3	Assessment of efficacy, data analysis and interpretation	The result of this investigation was that under the high level of control of <i>Anobium punctatum</i> egg Additional trials have to be performed to underst the dose rates of the fumigant to achieve the LA stage at different temperatures.	he described conditions a gs was achieved. stand the variability of AD for this specific life		
5.4	Conclusion	There are different life stages of <i>Anobium punct</i> wooden structures. The laboratory fumigation to considered to be a valid and effective procedure efficacy of sulfuryl fluoride on the eggs of <i>A. pu</i> results showed that sulfuryl fluoride was highly pest species.	<i>tatum</i> present in infested test undertaken was e for evaluating the <i>unctatum</i> . The efficacy effective on eggs of this		
5.5	Proposed efficacy specification	Control of eggs is excellent 100 % mortality at 1197 g-h/m ³ at a temperature of 20.6 °C and 83	the evaluated LAD of % relative humidity.		

	Evaluation by Competent Authorities						
	EVALUATION BY RAPPORTEUR MEMBER STATE						
Date	October 2004.						
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.						
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).						
	In the second table containing data on treated eggs, examined after 88 days there is a line missing. The whole, corrected table is given here:						
	В		Treate	d Eggs]	
	No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae		
	16	133	0	0	0		
	17	293	1	1	0		
	18	161	3	3	0		
	19	243	1	1	0		
	20 271 4 4 0						
	total 1101 9 9 0						
	In the next table, containing data on untreated control eggs, examined after 228 days, the sum of larvae survived should be 1035.						
Summary and conclusion	Applicant's ve	rsion is adopted	d.				

1.1	Test	organisms	-	Anobium	punctatum
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Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	1101.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 1101 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 28.3 g/m ³ for a total exposure period of 42 hours and 15 minutes leading to an accumulated dosage of 1197 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 20.6 °C.
Moisture	Fumigation was conducted at an average 83 % relative humidity.

Section B5.10.2		Efficacy Data				
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/23 Anobium punctatum Laboratory study (ref. Z23)				
		1 REFERENCE: Z23, B5.10.2/23	Official use only			
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).				
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany				
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.				
		Laboratory study on <i>Anobium punctatum</i> Number: $130377/A$ and 403972 (Bioassay $21 - 25$).				
1.2	Data protection	Yes.				
1.2.1	Data owner	Dow AgroSciences LLC.				
1.2.2	Companies with letter of Access	None.				
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I.				
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.				
1.4	Deviations	Not applicable as the study not conducted to an international standard method.				
		2 METHOD				
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.				
2.1.1	Trade name/ proposed trade name	Vikane.				
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.				
2.1.3	Physical state and nature	Fumigant.				
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.				
2.1.5	Method of analysis	Not applicable.				
2.2	Reference substance	No reference substance was included in the study.				
2.2.1	Method of analysis for reference substance	Not applicable.				
2.3	Testing procedure					
2.3.1	Test population / inoculum /	See Table 1.1.				

Dow A	AgroSciences : Sweden	April 2004	Vikane	Doc I	II-B5
Sectio	on B5.10.2	Efficacy Data			
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/23 Anol Laboratory stud	bium punctatum dy (ref. Z23)		
	test organism				
2.3.2	Test system	See Table 1.2.			
2.3.3	Application of TS	See Table 1.3.			
2.3.4	Test conditions	See Table 1.4.			
2.3.5	Duration of the test / Exposure time	41 hours and 50 min	nutes.		
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	Untreated controls v same conditions as t	were included; these were kept and st the treated eggs of <i>Anobium punctatu</i>	ored under the <i>m</i> .	Х
2.4	Examination				
2.4.1	Effect investigated	Lethal accumulated were determined – I treatment.	dosage (LAD) expressed as g-h/m ³ . LAD 88 days after treatment and LAI	Two effects D 228 days after	
2.4.2	Method for recording / scoring of the effect	Egg-mortality by ex eggs 88 days after tr (i.e. 228 days after t	amination (count) of larvae hatched a reatment and survival of these larvae reatment).	from treated 140 days later	
2.4.3	Intervals of examination	Larvae hatched from survival 228 days at	n treated eggs 88 days after treatment fter treatment.	and larvae	
2.4.4	Statistics	Post fumigation meanumber of dead egg treatment and 228 d	an total mortality was calculated by d s by the total number of treated eggs ays after treatment.	lividing the 88 days after	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.			
		3 RESULTS	\$		
3.1	Efficacy	The percentage mor hatched and survivi	tality was calculated by dividing the ng larvae by the total number of treat	total number of ed eggs.	Х

exposure to summy muoride.				
А		Untreate	d Control	
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
1	153	150	150	0
2	97	97	97	0
3	88	88	88	0
4	127	127	127	0
5	98	96	96	0
6	87	87	87	0
7	100	100	100	0

Percentage mortality of eggs of *Anobium punctatum* 88 days after exposure to sulfuryl fluoride.

Dow AgroSciences April 2004 RMS: Sweden

8	88	88	88	0
9	109	107	107	0
10	123	122	122	0
total	1070	1062	1062	0
$T_{1} = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =$				

Vikane

Total mortality of untreated eggs 0.75 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
21	293	1	1	0
22	268	4	4	0
23	102	0	0	0
24	169	16	16	0
25	261	9	9	0
total	1093	30	30	0

Total mortality of treated eggs: 97.26 %.

Percentage mortality of eggs of *Anobium punctatum* 228 days after exposure to sulfuryl fluoride.

enposare to sumary muornaet				
A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
1	153	150	150	150
2	97	97	97	97
3	88	88	88	88
4	127	127	127	127
5	98	96	96	95
6	87	87	87	87
7	100	100	100	98
8	88	88	88	85
9	109	107	107	99
10	123	122	122	109
total	1070	1062	1062	1035

Total mortality of untreated eggs: 3.27 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
21	293	1	1	0
22	268	4	4	1
23	102	0	0	0
24	169	16	16	4
25	261	9	9	1
total	1093	30	30	6

Total mortality of treated eggs: 99.45 %.

Dow A RMS:	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, ·Ch. 6	B5.10.2/23 Anob Laboratory stud	ium punctatum y (ref. Z23)	
3.1.1	Dose/Efficacy curve	Not available from re	port	
3.1.2	Begin and duration of effects	A mortality of 97.26 % was achieved 88 days after treatment and of 99.45 % 228 days after treatment.		eatment and of
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.		
3.2	Effects against organisms or objects to be protected	None reported.	None reported.	
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	No reference substan	ce was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEVAN FIELD CO	CE OF THE RESULTS COM NDITIONS	PARED TO
4.1	Reasons for	1 Precise condit	tions could be determined.	
	laboratory testing	2 Practical, accu	urate procedure.	
		Data generated is cor obtained from the fie	nsidered relevant for field of use.	Test insects
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions			
4.3.1	Application method	The principle of fum sufficient period of ti target pest. There are to achieve this althou	igation is to confine a sufficient ime to enable a toxic dose to be r e a number of ways in laboratory igh the principle is the same.	concentration for a received by the and field studies
4.3.2	Test organism	There are different line considered to be the	fe stages of Anobium punctatum stage which would require a high	. Eggs are her dose of sulfuryl

Dow A RMS:	AgroSciences : Sweden	April 2004 Vikane	Doc III-B5	
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/23 Anobium punctatum Laboratory study (ref. Z23)		
		fluoride compared to the other stages.		
4.3.3	Observed effect	The high mortality effect, recorded in the laboratory test is considered as the desired field response for eradication of eggs of <i>Anobium punctatum</i> .		
4.4	Relevance for read-across	Not applicable.		
		5 APPLICANT'S SUMMARY A	ND CONCLUSION	
5.1	Materials and methods	Eggs of <i>Anobium punctatum</i> were fumiga 41 hours and 50 minutes at 20.1 °C and 82 laboratory fumitoria. Bioassays from labor to EN 49.1 (1992) ("Holzschutzmittel - B Wirkung gegenüber <i>Anobium punctatum</i> der Eiablage und des Überlebens von Lar Oberflächenbehandlung (Laboratoriumsv determine LAD. Fumigant concentration Fumiscope gas analyser. Mortality rate w days after treatment.	ted with sulfuryl fluoride for 2 % relative humidity in pratory population according estimmung der vorbeugenden (De Geer) durch Beobachten ven - Teil 1: erfahren)") were tested to was measured using a as evaluated 88 days and 228	
5.2	Reliability	Reliability indicator 2: Study conducted in accepted scientific principles, possibly wi methodological deficiencies, which do no results.	n accordance with generally th incomplete reporting or t affect the quality of relevant	
5.3	Assessment of efficacy, data analysis and interpretation	The result of this investigation was that us high level of control of <i>Anobium punctatu</i> Additional trials have to be performed to the dose rates of the fumigant to achieve to stage at different temperatures.	nder the described conditions a <i>m</i> eggs was achieved. understand the variability of he LAD for this specific life	
5.4	Conclusion	There are different life stages of <i>Anobium</i> wooden structures. The laboratory fumig considered to be a valid and effective procefficacy of sulfuryl fluoride on the eggs or results showed that sulfuryl fluoride was lipest species.	<i>punctatum</i> present in infested ation test undertaken was bedure for evaluating the f <i>A. punctatum</i> . The efficacy highly effective on eggs of this	
5.5	Proposed efficacy specification	Control of eggs is excellent 99.45 % mort 974 g-h/m ³ at a temperature of 20.1°C and	ality at the evaluated LAD of 1 82 % relative humidity.	

	Evaluation by Competent Authorities
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).
Summary and conclusion	Applicant's version is adopted.

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)") ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	1093.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 1093 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8

Dow AgroSciences	April 2004	Vikane	
RMS: Sweden			

	Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 23.3 g/m ³ for a total exposure period of 41 hours and 50 minutes leading to an accumulated dosage of 974 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 20.1 °C.
Moisture	Fumigation was conducted at an average 82 % relative humidity.

Section B5.10.2		Efficacy Data				
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/24 Anobium punctatum Laboratory study (Ref. Z24)				
		1 REFERENCE: Z24, B5.10.2/24	Official use only			
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).				
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany				
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.				
		Laboratory study on <i>Anobium punctatum</i> Number: $130377/A$ and 403972 (Bioassay $26 - 30$).				
1.2	Data protection	Yes.				
1.2.1	Data owner	Dow AgroSciences LLC.				
1.2.2	Companies with letter of Access	None.				
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I				
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.				
1.4	Deviations	Not applicable as the study not conducted to an international standard method.				
		2 METHOD				
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.				
2.1.1	Trade name/ proposed trade name	Vikane.				
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.				
2.1.3	Physical state and nature	Fumigant.				
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.				
2.1.5	Method of analysis	Not applicable.				
2.2	Reference substance	No reference substance was included in the study.				
2.2.1	Method of analysis for reference substance	Not applicable.				
2.3	Testing procedure					
2.3.1	Test population / inoculum /	See Table 1.1.				

Dow . RMS	AgroSciences : Sweden	April 2004 Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data	
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/24 Anobium punctatum Laboratory study (Ref. Z24)	
	test organism		
2.3.2	Test system	See Table 1.2.	
2.3.3	Application of TS	See Table 1.3.	
2.3.4	Test conditions	See Table 1.4.	
2.3.5	Duration of the test / Exposure time	43 hours.	
2.3.6	Number of replicates performed	One.	
2.3.7	Controls	Untreated controls were included, these were kept and stored und same conditions as the treated eggs of <i>Anobium punctatum</i> .	er the X
2.4	Examination		
2.4.1	Effect investigated	Lethal accumulated dosage (LAD) expressed as g-h/m ³ . Two effective were determined – LAD 88 days after treatment and LAD 228 day treatment.	ects ys after
2.4.2	Method for recording / scoring of the effect	Egg-mortality by examination (count) of larvae hatched from trea eggs 88 days after treatment and survival of these larvae 140 days (i.e. 228 days after treatment).	ited s later
2.4.3	Intervals of examination	Larvae hatched from treated eggs 88 days after treatment and larv survival 228 days after treatment.	'ae
2.4.4	Statistics	Post fumigation mean total mortality was calculated by dividing t number of dead eggs by the total number of treated eggs 88 days treatment and 228 days after treatment.	he after
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.	
		3 RESULTS	
3.1	Efficacy	The percentage mortality was calculated by dividing the total num hatched and surviving larvae by the total number of treated eggs.	nber of X

exposure to summing muoride.				
А	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
1	153	150	150	0
2	97	97	97	0
3	88	88	88	0
4	127	127	127	0
5	98	96	96	0
6	87	87	87	0
7	100	100	100	0

Percentage mortality of eggs of *Anobium punctatum* 88 days after exposure to sulfuryl fluoride.

Dow AgroSciences April 2004 Vikane RMS: Sweden

8	88	88	88	0
9	109	107	107	0
10	123	122	122	0
total	1070	1062	1062	0
Γ_{2}				

Total mortality of untreated eggs 0.75 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
26	255	1	1	0
27	159	0	0	0
28	138	1	1	0
29	195	0	0	0
30	192	0	0	0
total	939	2	2	0

Total mortality of treated eggs: 99.79 %.

Percentage mortality of eggs of *Anobium punctatum* 228 days after exposure to sulfuryl fluoride.

exposure to summifi muornaet				
A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
1	153	150	150	150
2	97	97	97	97
3	88	88	88	88
4	127	127	127	127
5	98	96	96	95
6	87	87	87	87
7	100	100	100	98
8	88	88	88	85
9	109	107	107	99
10	123	122	122	109
total	1070	1062	1062	1035

Total mortality of untreated eggs: 3.27 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
26	255	1	1	0
27	159	0	0	0
28	138	1	1	0
29	195	0	0	0
30	192	0	0	0
total	939	2	2	0

Total mortality of treated eggs: 100 %.

Dow A	AgroSciences : Sweden	April 2004 Vikane I	Doc III-B5		
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/24 Anobium punctatum Laboratory study (Ref. Z24)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 99.79 % was achieved 88 days after treatment and of 100 % 228 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1 Precise conditions could be determined.			
	laboratory testing	2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Eggs are considered to be the stage which would require a higher dose of sulf	furyl		

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5			
Section B5.10.2		Efficacy Data					
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/24 And Laboratory stu	B5.10.2/24 Anobium punctatum Laboratory study (Ref. Z24)				
		fluoride compared	to the other stages.				
4.3.3	Observed effect	The high mortality the desired field re <i>punctatum</i> .	effect, recorded in the laboratory sponse for eradication of eggs of A	test is considered as Anobium			
4.4	Relevance for read-across	Not applicable.					
		5 APPLIC	ANT'S SUMMARY AND CONC	CLUSION			
5.1	Materials and methods	Eggs of Anobium p 43 hours at 20.4 °C Bioassays from lat ("Holzschutzmitte gegenüber Anobiu Eiablage und des U Oberflächenbeham - Bestimmung der punctatum (De Ge Überlebens von La (Laboratoriumsver concentration was rate was evaluated	<i>bunctatum</i> were fumigated with su C and 87 % relative humidity in lab boratory population according to E I - Bestimmung der vorbeugenden <i>m punctatum</i> (De Geer) durch Beo Jberlebens von Larven - Teil 1: dlung (Laboratoriumsverfahren)") vorbeugenden Wirkung gegenüber er) durch Beobachten der Eiablage urven - Teil 1: Oberflächenbehandl fahren)") were tested to determine measured using a Fumiscope gas a 88 days and 228 days after treatm	lfuryl fluoride for poratory fumitoria. N 49.1 (1992) Wirkung bachten der ("Holzschutzmittel r Anobium e und des lung b LAD. Fumigant analyser. Mortality ent.			
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordance principles, possibly with incomple ficiencies, which do not affect the	ce with generally ete reporting or quality of relevant			
5.3	Assessment of efficacy, data analysis and interpretation	The result of this i high level of contr Additional trials has the dose rates of the stage at different to	nvestigation was that under the desol of <i>Anobium punctatum</i> eggs was ave to be performed to understand the fumigant to achieve the LAD for emperatures.	scribed conditions a s achieved. the variability of r this specific life			
5.4	Conclusion	There are different wooden structures considered to be a efficacy of sulfury results showed tha pest species.	life stages of <i>Anobium punctatum</i> . The laboratory fumigation test up valid and effective procedure for el fluoride on the eggs of <i>A. punctat</i> . t sulfuryl fluoride was highly effective	present in infested ndertaken was evaluating the <i>tum</i> . The efficacy ctive on eggs of this			
5.5	Proposed efficacy specification	Control of eggs is 1819 g-h/m ³ at a te	excellent 100 % mortality at the even perature of 20.4 °C and 87 % re	valuated LAD of lative humidity.			

	Evaluation by Competent Authorities	
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.	
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.	
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).	
Summary and conclusion	Applicant's version is adopted.	

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)") ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	939.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 939 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8

Dow AgroSciences	April 2004	Vikane
RMS: Sweden		

	Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 42.3 g/m ³ for a total exposure period of 43 hours leading to an accumulated dosage of 1819 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 20.4 °C.
Moisture	Fumigation was conducted at an average 87 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/25 Anobium punctatum Laboratory study (Ref. Z25)			
		1 REFERENCE: Z25, B5.10.2/25	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.			
		Laboratory study on <i>Anobium punctatum</i> Number: 130377/A and 403972 (Bioassay 31 – 35).			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc I	II-B5
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/25 Anol Laboratory stud	bium punctatum dy (Ref. Z25)		
	test organism				
2.3.2	Test system	See Table 1.2.			
2.3.3	Application of TS	See Table 1.3.			
2.3.4	Test conditions	See Table 1.4.			
2.3.5	Duration of the test / Exposure time	42 hours and 40 mir	nutes.		
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	Untreated controls v same conditions as t	vere included; these were kept and the treated eggs of <i>Anobium puncta</i>	stored under the <i>tum</i> .	Х
2.4	Examination				
2.4.1	Effect investigated	Lethal accumulated were determined – I treatment.	dosage (LAD) expressed as g-h/m ³ LAD 88 days after treatment and LA	. Two effects AD 228 days after	
2.4.2	Method for recording / scoring of the effect	Egg-mortality by ex eggs 88 days after tr (i.e. 228 days after t	amination (count) of larvae hatched reatment and survival of these larva reatment).	d from treated e 140 days later	
2.4.3	Intervals of examination	Larvae hatched from survival 228 days af	n treated eggs 88 days after treatme fter treatment.	nt and larvae	
2.4.4	Statistics	Post fumigation meanumber of dead egg treatment and 228 d	an total mortality was calculated by s by the total number of treated egg ays after treatment.	dividing the s 88 days after	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.			
		3 RESULTS			
3.1	Efficacy	The percentage mor hatched and survivi	tality was calculated by dividing th ng larvae by the total number of tre	e total number of ated eggs.	Х

exposure to sunary mornae.						
А	Untreated Control					
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae		
1	153	150	150	0		
2	97	97	97	0		
3	88	88	88	0		
4	127	127	127	0		
5	98	96	96	0		
6	87	87	87	0		
7	100	100	100	0		

Percentage mortality of eggs of *Anobium punctatum* 88 days after exposure to sulfuryl fluoride.

Dow AgroSciences April 2004 Vikane RMS: Sweden

8	88	88	88	0
9	109	107	107	0
10	123	122	122	0
total	1070	1062	1062	0
$T_{-1} = 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1$				

Total mortality of untreated eggs 0.75 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
31	279	3	3	0
32	119	0	0	0
33	184	0	0	0
34	215	0	0	0
35	122	0	0	0
total	919	3	3	0

Total mortality of treated eggs: 99.67 %.

Percentage mortality of eggs of *Anobium punctatum* 228 days after exposure to sulfuryl fluoride.

enposare to sumary muornaet					
A	Untreated Control				
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived	
1	153	150	150	150	
2	97	97	97	97	
3	88	88	88	88	
4	127	127	127	127	
5	98	96	96	95	
6	87	87	87	87	
7	100	100	100	98	
8	88	88	88	85	
9	109	107	107	99	
10	123	122	122	109	
total	1070	1062	1062	1035	

Total mortality of untreated eggs: 3.27 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
31	279	3	3	0
32	119	0	0	0
33	184	0	0	0
34	215	0	0	0
35	122	0	0	0
total	919	3	3	0

Total mortality of treated eggs: 100 %.

Dow A	AgroSciences Sweden	April 2004VikaneDescription	oc III-B5		
N N I D	5 weden				
Sectio	on B5.10.2	Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/25 Anobium punctatum Laboratory study (Ref. Z25)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 99.67 % was achieved 88 days after treatment and of 100 % 228 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for laboratory testing	1 Precise conditions could be determined.			
		2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions	Not applicable.			
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration fo sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studie to achieve this although the principle is the same.	r a es		
4.3.2	Test organism	There are different life stages of Anobium punctatum. Eggs are			

Dow RMS	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5	
Sectio	on B5.10.2	Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/25 Anobium punctatum Laboratory study (Ref. Z25)			
		considered to be th fluoride compared	e stage which would require a high to the other stages.	er dose of sulfuryl	
4.3.3	Observed effect	The high mortality the desired field response to the punctatum.	effect, recorded in the laboratory te sponse for eradication of eggs of <i>Ar</i>	est is considered as <i>nobium</i>	
4.4	Relevance for read-across	Not applicable.			
		5 APPLICA	ANT'S SUMMARY AND CONCI	LUSION	
5.1	Materials and methods	Eggs of <i>Anobium p</i> 42 hours and 40 mi laboratory fumitori to EN 49.1 (1992) (Wirkung gegenübe der Eiablage und de Oberflächenbehand - Bestimmung der punctatum (De Gee Überlebens von La (Laboratoriumsvert concentration was p rate was evaluated	<i>unctatum</i> were fumigated with sulf nutes at 20.2 °C and 87 % relative 1 a. Bioassays from laboratory popu ("Holzschutzmittel - Bestimmung d r <i>Anobium punctatum</i> (De Geer) du es Überlebens von Larven - Teil 1: flung (Laboratoriumsverfahren)") (vorbeugenden Wirkung gegenüber - er) durch Beobachten der Eiablage u rven - Teil 1: Oberflächenbehandlu fahren)") were tested to determine I measured using a Fumiscope gas ar 88 days and 228 days after treatmet	Yuryl fluoride for humidity in lation according ler vorbeugenden urch Beobachten "Holzschutzmittel Anobium und des ng LAD. Fumigant nalyser. Mortality nt.	
5.2	Reliability	Reliability indicato accepted scientific methodological def results.	r 2: Study conducted in accordance principles, possibly with incomplet ficiencies, which do not affect the q	e with generally e reporting or uality of relevant	
5.3	Assessment of efficacy, data analysis and interpretation	The result of this ir high level of contro Additional trials ha the dose rates of the stage at different te	ivestigation was that under the desc of of <i>Anobium punctatum</i> eggs was ve to be performed to understand the fumigant to achieve the LAD for mperatures.	cribed conditions a achieved. ne variability of this specific life	
5.4	Conclusion	There are different wooden structures. considered to be a efficacy of sulfuryl results showed that pest species.	life stages of <i>Anobium punctatum</i> p The laboratory fumigation test und valid and effective procedure for ev fluoride on the eggs of <i>A. punctatu</i> sulfuryl fluoride was highly effect	bresent in infested dertaken was valuating the um. The efficacy ive on eggs of this	
5.5	Proposed efficacy specification	Control of eggs is e 1600 g-h/m ³ at a te	excellent 100 % mortality at the eva mperature of 20.2 °C 87 % relative	luated LAD of humidity.	
	Evaluation by Competent Authorities				
------------------------	--	--	--		
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.				
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.				
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).				
Summary and conclusion	Applicant's version is adopted.				

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)") ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	919.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 919 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8

Dow AgroSciences	April 2004	Vikane	
RMS: Sweden			

	Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 37.5 g/m ³ for a total exposure period of 42 hours and 40 minutes leading to an accumulated dosage of 1600 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 20.2 °C.
Moisture	Fumigation was conducted at an average 87 % relative humidity.

Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/26 Anobium punctatum Laboratory study (Ref. Z26)			
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.			
		Laboratory study on <i>Anobium punctatum</i> Number: $130377/A$ and 403972 (Bioassay $36 - 40$).			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				

Dow A RMS:	AgroSciences : Sweden	April 2004	Vikane Doc	III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/26 And Laboratory stu	obium punctatum 1dy (Ref. Z26)	
2.3.1	Test population / inoculum / test organism	See Table 1.1.		
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	72 hours and 5 min	nutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls same conditions as	were included; these were kept and stored under the s the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulate were determined – treatment.	d dosage (LAD) expressed as g-h/m ³ . Two effects LAD 85 days after treatment and LAD 225 days after	r
2.4.2	Method for recording / scoring of the effect	Egg-mortality by e eggs 85 days after (i.e. 225 days after	examination (count) of larvae hatched from treated treatment and survival of these larvae 140 days later treatment).	
2.4.3	Intervals of examination	Larvae hatched fro survival 225 days	om treated eggs 85 days after treatment and larvae after treatment.	
2.4.4	Statistics	Post fumigation m number of dead eg treatment and 225	ean total mortality was calculated by dividing the ggs by the total number of treated eggs 85 days after days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESULT	`S	
3.1	Efficacy	The percentage monotonic hatched and survive	ortality was calculated by dividing the total number of ring larvae by the total number of treated eggs.	X

Percentage mortality of eggs of *Anobium punctatum* 85 days after exposure to sulfuryl fluoride.

	emposar	e eo sanar ji ne		
A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
1	153	150	150	0
2	97	97	97	0
3	88	88	88	0
4	127	127	127	0

Dow AgroSciences April 2004 RMS: Sweden

5	98	96	96	0
6	87	87	87	0
7	100	100	100	0
8	88	88	88	0
9	109	107	107	0
10	123	122	122	0
total	1070	1062	1062	0

Vikane

Total mortality of untreated eggs 0.75 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
36	174	0	0	0
37	327	0	0	0
38	133	0	0	0
39	277	0	0	0
40	271	0	0	0
total	1182	0	0	0

Total mortality of treated eggs: 100 %.

Percentage mortality of eggs of *Anobium punctatum* 225 days after exposure to sulfuryl fluoride.

A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
1	153	150	150	150
2	97	97	97	97
3	88	88	88	88
4	127	127	127	127
5	98	96	96	95
6	87	87	87	87
7	100	100	100	98
8	88	88	88	85
9	109	107	107	99
10	123	122	122	109
total	1070	1062	1062	1035

Total mortality of untreated eggs: 3.27 %.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/26 Anobium punctatum Laboratory study (Ref. Z26)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 85 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1 Precise conditions could be determined.			
	laboratory testing	2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Eggs are considered to be the stage which would require a higher dose of sulfuryl			

Dow RMS	AgroSciences : Sweden	April 2004 Vika	nne	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III	Point IIB5.10 Pt. I-B5.10, -Ch. 6	B5.10.2/26 Anobium punct Laboratory study (Ref. Z2	atum 6)	
		fluoride compared to the other sta	ges.	
4.3.3	Observed effect	The high mortality effect, recordent the desired field response for erad <i>punctatum</i> .	d in the laboratory test is cor ication of eggs of <i>Anobium</i>	sidered as
4.4	Relevance for read-across	Not applicable.		
		5 APPLICANT'S SUMM	ARY AND CONCLUSION	1
5.1	Materials and methods	Eggs of <i>Anobium punctatum</i> were 72 hours and 5 minutes at 17.2 °C laboratory fumitoria. Bioassays fi to EN 49.1 (1992) ("Holzschutzm Wirkung gegenüber <i>Anobium pun</i> der Eiablage und des Überlebens vo Oberflächenbehandlung (Laborato - Bestimmung der vorbeugenden V punctatum (De Geer) durch Beoba Überlebens von Larven - Teil 1: C (Laboratoriumsverfahren)") were concentration was measured using rate was evaluated 85 days and 22	fumigated with sulfuryl fluc and 89 % relative humidity rom laboratory population ac ittel - Bestimmung der vorbe <i>ctatum</i> (De Geer) durch Beo yon Larven - Teil 1: priumsverfahren)") ("Holzsel Wirkung gegenüber Anobium achten der Eiablage und des oberflächenbehandlung tested to determine LAD. Fu g a Fumiscope gas analyser. 5 days after treatment.	umigant Mortality
5.2	Reliability	Reliability indicator 2: Study conc accepted scientific principles, post methodological deficiencies, whic results.	lucted in accordance with ge sibly with incomplete report h do not affect the quality of	nerally ing or frelevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this investigation wa high level of control of <i>Anobium p</i> Additional trials have to be perfor the dose rates of the fumigant to a stage at different temperatures.	s that under the described co <i>punctatum</i> eggs was achieved med to understand the varial chieve the LAD for this spec	nditions a l. pility of pific life
5.4	Conclusion	There are different life stages of <i>A</i> wooden structures. The laboratory considered to be a valid and effect efficacy of sulfuryl fluoride on the results showed that sulfuryl fluoride pest species.	<i>nobium punctatum</i> present in y fumigation test undertaken ive procedure for evaluating e eggs of <i>A. punctatum</i> . The de was highly effective on eg	n infested was the efficacy ggs of this
5.5	Proposed efficacy specification	Control of eggs is excellent 100 % 2586 g-h/m ³ at a temperature of 1	mortality at the evaluated L 7.2 °C and 89 % relative hum	AD of nidity.

	Evaluation by Competent Authorities
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).
Summary and conclusion	Applicant's version is adopted.

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)") ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	1182.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 1182 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8

Dow AgroSciences	April 2004	Vikane	Doc
RMS: Sweden			

	Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 35.9 g/m^3 for a total exposure period of 72 hours and 5 minutes leading to an accumulated dosage of 2586 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 17.2 °C.
Moisture	Fumigation was conducted at an average 89 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10TNsG: Pt. I-B5.10,Pt. III-Ch. 6Labor		5.10.2/27 Anobium punctatum aboratory study (Ref. Z27)			
		1 REFERENCE: Z27, B5.10.2/27	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.			
		Laboratory study on <i>Anobium punctatum</i> Number: $130377/A$ and 403972 (Bioassay $41 - 45$).			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow A	AgroSciences : Sweden	April 2004	Vikane De	oc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex Point IIB5.10TNsG: Pt. I-B5.10,Pt. III-Ch. 6B5.10.2/27 Anobium punctatumLaboratory study (Ref. Z27)				
	test organism			
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	69 hours and 55 m	inutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls same conditions as	s were included, these were kept and stored under the s the treated eggs of <i>Anobium punctatum</i> .	e X
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulate were determined – treatment.	d dosage (LAD) expressed as g-h/m ³ . Two effects - LAD 85 days after treatment and LAD 225 days a	fter
2.4.2	Method for recording / scoring of the effect	Egg-mortality by e eggs 85 days after (i.e. 225 days after	examination (count) of larvae hatched from treated treatment and survival of these larvae 140 days later treatment).	er
2.4.3	Intervals of examination	Larvae hatched fro survival 225 days	om treated eggs 85 days after treatment and larvae after treatment.	
2.4.4	Statistics	Post fumigation m number of dead eg treatment and 225	ean total mortality was calculated by dividing the ggs by the total number of treated eggs 85 days after days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESULT	ſS	
3.1	Efficacy	The percentage me hatched and surviv	ortality was calculated by dividing the total number ving larvae by the total number of treated eggs.	of X

Percentage mortality of eggs of *Anobium punctatum* 85 days after exposure to sulfuryl fluoride.

en posare to sairar ji haomat				
A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
1	153	150	150	0
2	97	97	97	0
3	88	88	88	0
4	127	127	127	0
5	98	96	96	0
6	87	87	87	0

Dow AgroSciences April 2004 Vikane RMS: Sweden

7	100	100	100	0
8	88	88	88	0
9	109	107	107	0
10	123	122	122	0
total	1070	1062	1062	0

Total mortality of untreated eggs 0.75 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
41	117	0	0	0
42	165	0	0	0
43	194	0	0	0
44	183	0	0	0
45	218	0	0	0
total	877	0	0	0

Total mortality of treated eggs: 100 %.

Percentage mortality of eggs of *Anobium punctatum* 225 days after exposure to sulfuryl fluoride.

Δ				
No.	Eggs	Larvae	Larvae	Larvae survived
1	153	150	150	150
2	97	97	97	97
3	88	88	88	88
4	127	127	127	127
5	98	96	96	95
6	87	87	87	87
7	100	100	100	98
8	88	88	88	85
9	109	107	107	99
10	123	122	122	109
total	1070	1062	1062	1035

Total mortality of untreated eggs: 3.27 %.

Sectio	on B5.10.2	Efficacy Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2.27 Anobium punctatum Laboratory study (Ref. Z27)	
3.1.1	Dose/Efficacy curve	Not available from report.	
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 85 days after treatment.	
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.	
3.2	Effects against organisms or objects to be protected	None reported.	
3.3	Other effects	None reported.	
3.4	Efficacy of the reference substance	No reference substance was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.	
3.6	Efficacy limiting factors		
3.6.1	Occurrences of resistances	None reported.	
3.6.2	Other limiting factors	None reported.	
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS	
4.1	Reasons for	1 Precise conditions could be determined.	
	laboratory testing	2 Practical, accurate procedure.	
		Data generated is considered relevant for field of use. Test insects obtained from the field.	
4.2	Intended actual scale of biocide application	Not applicable.	
4.3	Relevance compared to field conditions		
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.	
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Eggs are considered to be the stage which would require a higher dose of sulfuryl	

229(342)

Dow A RMS	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2.27 And Laboratory st	obium punctatum udy (Ref. Z27)	
		fluoride compared	to the other stages.	
4.3.3	Observed effect	The high mortality the desired field reprint <i>punctatum</i> .	effect, recorded in the laboratory esponse for eradication of eggs of a	test is considered as <i>Anobium</i>
4.4	Relevance for read-across	Not applicable.		
		5 APPLIC	ANT'S SUMMARY AND CON	CLUSION
5.1	Materials and methods	Eggs of <i>Anobium punctatum</i> were fumigated with sulfuryl fluoride for 69 hours and 55 minutes at 17 °C and 87 % relative humidity in laboratory fumitoria. Bioassays from laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)") ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)") were tested to determine LAD. Fumigant concentration was measured using a Fumiscope gas analyser. Mortality		llfuryl fluoride for humidity in pulation according g der vorbeugenden durch Beobachten l:) ("Holzschutzmittel er Anobium e und des llung e LAD. Fumigant analyser. Mortality nent.
5.2	Reliability	Reliability indicator 2: Study conducted in accordance with generally accepted scientific principles, possibly with incomplete reporting or methodological deficiencies, which do not affect the quality of relevant results.		ce with generally lete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this investigation was that under the described conditions a high level of control of <i>Anobium punctatum</i> eggs was achieved. Additional trials have to be performed to understand the variability of the dose rates of the fumigant to achieve the LAD for this specific life stage at different temperatures.		escribed conditions a as achieved. I the variability of or this specific life
5.4	Conclusion	There are different life stages of <i>Anobium punctatum</i> present in infested wooden structures. The field fumigation test undertaken was considered to be a valid and effective procedure for evaluating the efficacy of sulfuryl fluoride on the eggs of <i>A. punctatum</i> . The efficacy results showed that sulfuryl fluoride was highly effective on eggs of this pest species.		<i>n</i> present in infested aken was considered the efficacy of efficacy results n eggs of this pest
5.5	Proposed efficacy specification	Control of eggs is 2421 g-h/m ³ at a to humidity.	excellent 100 % mortality at the e emperature of 17 °C and a moistur	valuated LAD of e of 87 % relative

	Evaluation by Competent Authorities
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).
Summary and conclusion	Applicant's version is adopted.

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)") ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	877.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 877 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8

Dow AgroSciences	April 2004	Vikane	Doc
RMS: Sweden			

	Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 34.6 g/m^3 for a total exposure period of 69 hours and 55 minutes leading to an accumulated dosage of 2421 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 17 °C.
Moisture	Fumigation was conducted at an average 87 % relative humidity.

Section B5.10.2		Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	.0 B5.10.2/28 Anobium punctatum Laboratory study (Ref. Z28)		
			0.00 A 4	
		1 REFERENCE: Z28, B5.10.2/28	Official use only	
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).		
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany		
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.		
		Laboratory study on <i>Anobium punctatum</i> Number: $130377/A$ and 403972 (Bioassay $46 - 50$).		
1.2	Data protection	Yes.		
1.2.1	Data owner	Dow AgroSciences LLC.		
1.2.2	Companies with letter of Access	None.		
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I		
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.		
1.4	Deviations	Not applicable as the study not conducted to an international standard method.		
		2 METHOD		
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.		
2.1.1	Trade name/ proposed trade name	Vikane.		
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.		
2.1.3	Physical state and nature	Fumigant.		
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.		
2.1.5	Method of analysis	Not applicable.		
2.2	Reference substance	No reference substance was included in the study.		
2.2.1	Method of analysis for reference substance	Not applicable.		
2.3	Testing procedure			
2.3.1	Test population / inoculum /	See Table 1.1.		

Dow A	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, •Ch. 6	B5.10.2/28 Ano Laboratory stu	bium punctatum dy (Ref. Z28)	
	test organism			
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	71 hours and 10 mi	nutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls same conditions as	were included; these were kept and stored under the treated eggs of <i>Anobium punctatum</i> .	er the X
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulated were determined – treatment.	l dosage (LAD) expressed as g-h/m ³ . Two effe LAD 85 days after treatment and LAD 225 day	cts /s after
2.4.2	Method for recording / scoring of the effect	Egg-mortality by energy 85 days after to (i.e. 225 days after to (i.e. 225 days after to the contemport of the contempor	xamination (count) of larvae hatched from treat treatment and survival of these larvae 140 days treatment).	ed later
2.4.3	Intervals of examination	Larvae hatched from survival 225 days a	m treated eggs 85 days after treatment and larva after treatment.	ae
2.4.4	Statistics	Post fumigation me number of dead egg treatment and 225 of	can total mortality was calculated by dividing the gs by the total number of treated eggs 85 days a days after treatment.	ne .fter
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESULT	S	
3.1	Efficacy	The percentage mo hatched and survive	rtality was calculated by dividing the total num ing larvae by the total number of treated eggs.	ber of X

Percentage mortality of eggs of *Anobium punctatum* 85 days after exposure to sulfuryl fluoride.

A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
1	153	150	150	0
2	97	97	97	0
3	88	88	88	0
4	127	127	127	0
5	98	96	96	0
6	87	87	87	0

Dow AgroSciences April 2004 Vikane RMS: Sweden

7	100	100	100	0
8	88	88	88	0
9	109	107	107	0
10	123	122	122	0
total	1070	1062	1062	0

Total mortality of untreated eggs 0.75 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
46	169	0	0	0
47	242	1	1	0
48	143	1	1	0
49	168	3	3	0
50	267	0	0	0
total	989	5	5	0

Total mortality of treated eggs: 99.49 %.

Percentage mortality of eggs of *Anobium punctatum* 225 days after exposure to sulfuryl fluoride.

A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
1	153	150	150	150
2	97	97	97	97
3	88	88	88	88
4	127	127	127	127
5	98	96	96	95
6	87	87	87	87
7	100	100	100	98
8	88	88	88	85
9	109	107	107	99
10	123	122	122	109
total	1070	1062	1062	1035

Total mortality of untreated eggs: 3.27 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
46	169	0	0	0
47	242	1	1	0
48	143	1	1	0
49	168	3	3	0
50	267	0	0	0
total	989	5	5	0

Total mortality of treated eggs: 100 %.

Dow RMS	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Section	on B5.10.2	Efficacy Data		
Annex TNsG Pt. III	: Point IIB5.10 : Pt. I-B5.10, -Ch. 6	B5.10.2/28 Anol Laboratory stue	bium punctatum ly (Ref. Z28)	
3.1.1	Dose/Efficacy curve	Not available from	report	
3.1.2	Begin and duration of effects	A mortality of 99.49 100 % 225 days after	9 % was achieved 85 days after treatmer treatment.	ent and of
3.1.3	Observed effects in the post monitoring phase	No unusual effect of	bserved.	
3.2	Effects against organisms or objects to be protected	None reported.		
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	No reference substa	nce was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEVAI FIELD CO	NCE OF THE RESULTS COMPAR DNDITIONS	RED TO
4.1	Reasons for	1 Precise cond	itions could be determined.	
	laboratory testing	2 Practical, acc	zurate procedure.	
		Data generated is co obtained from the fi	nsidered relevant for field of use. Teseld.	st insects
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions			
4.3.1	Application method	The principle of fun sufficient period of target pest. There a to achieve this altho	nigation is to confine a sufficient conc time to enable a toxic dose to be receiv re a number of ways in laboratory and ugh the principle is the same.	entration for a ved by the field studies
4.3.2	Test organism	There are different l considered to be the	ife stages of <i>Anobium punctatum</i> . Eg stage which would require a higher d	gs are ose of sulfuryl

Dow A RMS:	AgroSciences Sweden	April 2004 Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/28 Anobium punctatum Laboratory study (Ref. Z28)	
		fluoride compared to the other stages.	
4.3.3	Observed effect	The high mortality effect, recorded in the laboratory test is considered as the desired field response for eradication of eggs of <i>Anobium punctatum</i> .	
4.4	Relevance for read-across	Not applicable.	
		5 APPLICANT'S SUMMARY AND CON	NCLUSION
5.1	Materials and methods	Eggs of <i>Anobium punctatum</i> were fumigated with 71 hours and 10 minutes at 16.9 °C and 86 % relat- laboratory fumitoria. Bioassays from laboratory p- to EN 49.1 (1992) ("Holzschutzmittel - Bestimmur Wirkung gegenüber <i>Anobium punctatum</i> (De Geer der Eiablage und des Überlebens von Larven - Tei Oberflächenbehandlung (Laboratoriumsverfahren) determine LAD. Fumigant concentration was mea Fumiscope gas analyser. Mortality rate was evalua- days after treatment.	sulfuryl fluoride for ive humidity in opulation according ng der vorbeugenden) durch Beobachten 1 1: ") were tested to asured using a ated 85 days and 225
5.2	Reliability	Reliability indicator 2: Study conducted in accorda accepted scientific principles, possibly with incom methodological deficiencies, which do not affect th results.	ance with generally plete reporting or he quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this investigation was that under the of high level of control of <i>Anobium punctatum</i> eggs we Additional trials have to be performed to understar the dose rates of the fumigant to achieve the LAD stage at different temperatures.	described conditions a was achieved. nd the variability of for this specific life
5.4	Conclusion	There are different life stages of <i>Anobium punctatu</i> wooden structures. The laboratory fumigation test considered to be a valid and effective procedure fo efficacy of sulfuryl fluoride on the eggs of <i>A. punc</i> results showed that sulfuryl fluoride was highly efficient species.	<i>um</i> present in infested t undertaken was or evaluating the <i>etatum</i> . The efficacy fective on eggs of this
5.5	Proposed efficacy specification	Control of eggs is excellent 100 % mortality at the 1642 g-h/m ³ at a temperature of 16.9 °C and 86 %	evaluated LAD of relative humidity.

	Evaluation by Competent Authorities		
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.		
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.		
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).		
Summary and conclusion	Applicant's version is adopted.		

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)") ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	989.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 989 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8

Dow AgroSciences	April 2004	Vikane	Doc
RMS: Sweden			

	Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 23.1 g/m ³ for a total exposure period of 71 hours and 10 minutes leading to an accumulated dosage of 1642 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 16.9 °C.
Moisture	Fumigation was conducted at an average 86 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/29 Anobium punctatum Laboratory study (Ref. Z29)			
		1 REFERENCE: Z29, B5.10.2/29	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² EMPA, Swiss Federal Laboratories Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.			
		Laboratory study on <i>Anobium punctatum</i> Number: $130377/A$ and 403972 (Bioassay $51 - 55$).			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow A RMS	AgroSciences : Sweden	April 2004	4 Vikane Doc	III-B5
Sectio	on B5.10.2	Efficacy	Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, •Ch. 6	B5.10.2/2 Laborato	29 Anobium punctatum ory study (Ref. Z29)	
	test organism			
2.3.2	Test system	See Table 1	.2.	
2.3.3	Application of TS	See Table 1	.3.	
2.3.4	Test conditions	See Table 1	.4.	
2.3.5	Duration of the test / Exposure time	71 hours an	d 23 minutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated c same condi	ontrols were included; these were kept and stored under the tions as the treated eggs of <i>Anobium punctatum</i> .	Х
2.4	Examination			
2.4.1	Effect investigated	Lethal accu were detern treatment.	mulated dosage (LAD) expressed as g-h/m ³ . Two effects nined – LAD 85 days after treatment and LAD 225 days after	
2.4.2	Method for recording / scoring of the effect	Egg-mortal eggs 85 day (i.e. 225 day	ity by examination (count) of larvae hatched from treated vs after treatment and survival of these larvae 140 days later ys after treatment).	
2.4.3	Intervals of examination	Larvae hate survival 22:	whed from treated eggs 85 days after treatment and larvae 5 days after treatment.	
2.4.4	Statistics	Post fumiga number of a treatment an	ation mean total mortality was calculated by dividing the dead eggs by the total number of treated eggs 85 days after nd 225 days after treatment.	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RI	ESULTS	
3.1	Efficacy	The percent hatched and	tage mortality was calculated by dividing the total number of a surviving larvae by the total number of treated eggs.	Х

Percentage mortality of eggs of *Anobium punctatum* 85 days after exposure to sulfuryl fluoride.

	emposar	e to sanai ji ne		
A		Untreated Control		
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
1	153	150	150	0
2	97	97	97	0
3	88	88	88	0
4	127	127	127	0
5	98	96	96	0
6	87	87	87	0

Dow AgroSciences April 2004 Vikane RMS: Sweden

7	100	100	100	0
8	88	88	88	0
9	109	107	107	0
10	123	122	122	0
total	1070	1062	1062	0

Total mortality of untreated eggs 0.75 %.

В		Treate	d Eggs	
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
51	101	0	0	0
52	162	0	0	0
53	143	0	0	0
54	128	0	0	0
55	127	0	0	0
total	661	0	0	0

Total mortality of treated eggs: 100 %.

Percentage mortality of eggs of *Anobium punctatum* 225 days after exposure to sulfuryl fluoride.

		e eo sanar ji ne		
A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
1	153	150	150	150
2	97	97	97	97
3	88	88	88	88
4	127	127	127	127
5	98	96	96	95
6	87	87	87	87
7	100	100	100	98
8	88	88	88	85
9	109	107	107	99
10	123	122	122	109
total	1070	1062	1062	1035

Total mortality of untreated eggs: 3.27 %.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/29 Anobium punctatum Laboratory study (Ref. Z29)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 85 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1 Precise conditions could be determined.			
	laboratory testing	2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Eggs are considered to be the stage which would require a higher dose of sulfuryl			

Dow AgroSciences RMS: Sweden		April 2004 Vikane	Doc III-B5		
Sectio	on B5.10.2	Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/29 Anobium punctatum Laboratory study (Ref. Z29)			
		fluoride compared to the other stages.			
4.3.3	Observed effect	The high mortality effect, recorded in the the desired field response for eradication <i>punctatum</i> .	laboratory test is considered as of eggs of <i>Anobium</i>		
4.4	Relevance for read-across	Not applicable.			
		5 APPLICANT'S SUMMARY A	ND CONCLUSION		
5.1	Materials and methods	Eggs of <i>Anobium punctatum</i> were fumige 71 hours and 23 minutes at 16.9 °C and 8 laboratory fumitoria. Bioassays from lab to EN 49.1 (1992) ("Holzschutzmittel - E Wirkung gegenüber <i>Anobium punctatum</i> der Eiablage und des Überlebens von Lat Oberflächenbehandlung (Laboratoriumsv determine LAD. Fumigant concentration Fumiscope gas analyser. Mortality rate v days after treatment.	tted with sulfuryl fluoride for 2 % relative humidity in oratory population according testimmung der vorbeugenden (De Geer) durch Beobachten ven - Teil 1: erfahren)") were tested to was measured using a vas evaluated 85 days and 225		
5.2	Reliability	Reliability indicator 2: Study conducted i accepted scientific principles, possibly w methodological deficiencies, which do no results.	n accordance with generally ith incomplete reporting or of affect the quality of relevant		
5.3	Assessment of efficacy, data analysis and interpretation	The result of this investigation that under high level of control of <i>Anobium punctata</i> Additional trials have to be performed to the dose rates of the fumigant to achieve stage at different temperatures.	the described conditions a <i>um</i> eggs was achieved. understand the variability of the LAD for this specific life		
5.4	Conclusion	There are different life stages of <i>Anobium</i> wooden structures. The laboratory fumig considered to be a valid and effective pro efficacy of sulfuryl fluoride on the eggs or results showed that sulfuryl fluoride was pest species.	<i>a punctatum</i> present in infested ation test undertaken was cedure for evaluating the of <i>A. punctatum</i> . The efficacy highly effective on eggs of this		
5.5	Proposed efficacy specification	Control of eggs is excellent 100 % morta 2677 g-h/m ³ at a temperature of 16.9 °C	lity at the evaluated LAD of and 82 % relative humidity.		

	Evaluation by Competent Authorities		
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.		
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.		
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).		
Summary and conclusion	Applicant's version is adopted.		

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber <i>Anobium punctatum</i> (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	661.

1.2	Test system
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Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, $40 \ge 25 \ge 14.5 \text{ cm} = 14.5$ litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 661 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt

Dow AgroSciences April 2004 RMS: Sweden

Vikane

	sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details	
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitorium in its gaseous form.	
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.	
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 37.5 g/m ³ for a total exposure period of 71 hours and 23 minutes leading to an accumulated dosage of 2677 g-h/m ³ .	

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 16.9 °C.
Moisture	Fumigation was conducted at an average 82 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/30 Anobium punctatum Laboratory study (Ref. Z30)			
		1 REFERENCE: Z30, B5.10.2/30	use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Graf, E. and ² Lanz, B (1999).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² EMPA, Swiss Federal Laboratories for Materials Testing and Research Lerchenfeldstr. 5, CH-9014 St. Gallen, Switzerland.			
		Laboratory study on <i>Anobium punctatum</i> Number: $130377/A$ and 403972 (Bioassay $56 - 60$).			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow AgroSciences RMS: Sweden		April 2004	Vikane I	Doc III-B5
Section B5.10.2		Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/30 And Laboratory stu	obium punctatum 1dy (Ref. Z30)	
	test organism			
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	71 hours and 40 m	inutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls same conditions as	were included; these were kept and stored under the treated eggs of <i>Anobium punctatum</i> .	the X
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulated were determined – treatment.	d dosage (LAD) expressed as g-h/m ³ . Two effect LAD 85 days after treatment and LAD 225 days	s after
2.4.2	Method for recording / scoring of the effect	Egg-mortality by e eggs 85 days after (i.e. 225 days after	examination (count) of larvae hatched from treated treatment and survival of these larvae 140 days la treatment).	d uter
2.4.3	Intervals of examination	Larvae hatched fro survival 225 days a	m treated eggs 85 days after treatment and larvae after treatment.	;
2.4.4	Statistics	Post fumigation me number of dead eg treatment and 225	ean total mortality was calculated by dividing the gs by the total number of treated eggs 85 days aft days after treatment.	er
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESULT	S	
3.1	Efficacy	The percentage monotonic hatched and survive	ortality was calculated by dividing the total numbring larvae by the total number of treated eggs.	er of X

Percentage mortality of eggs of *Anobium punctatum* 85 days after exposure to sulfuryl fluoride.

v v					
А	Untreated Control				
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae	
1	153	150	150	0	
2	97	97	97	0	
3	88	88	88	0	
4	127	127	127	0	
5	98	96	96	0	
6	87	87	87	0	

Dow AgroSciences April 2004 Vikane RMS: Sweden

7	100	100	100	0
8	88	88	88	0
9	109	107	107	0
10	123	122	122	0
total	1070	1062	1062	0

Total mortality of untreated eggs 0.75 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Dead larvae
56	274	1	1	0
57	149	1	1	0
58	141	0	0	0
59	98	0	0	0
60	212	0	0	0
total	874	2	2	0

Total mortality of treated eggs: 99.77 %.

Percentage mortality of eggs of *Anobium punctatum* 225 days after exposure to sulfuryl fluoride.

A	Untreated Control			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
1	153	150	150	150
2	97	97	97	97
3	88	88	88	88
4	127	127	127	127
5	98	96	96	95
6	87	87	87	87
7	100	100	100	98
8	88	88	88	85
9	109	107	107	99
10	123	122	122	109
total	1070	1062	1062	1035

Total mortality of untreated eggs: 3.27 %.

В	Treated Eggs			
No.	Eggs	Larvae hatched	Larvae penetrated	Larvae survived
56	274	1	1	0
57	149	1	1	0
58	141	0	0	0
59	98	0	0	0
60	212	0	0	0
total	874	2	2	0

Total mortality of treated eggs: 100 %.

Dow RMS	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2		Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/30 Anobium punctatum Laboratory study (Ref. Z30)		
3.1.1	Dose/Efficacy curve	Not available from r	eport.	
3.1.2	Begin and duration of effects	A mortality of 99.77 100 % 225 days afte	% was achieved 85 days after treatment r treatment.	and of
3.1.3	Observed effects in the post monitoring phase	No unusual effect of	oserved.	
3.2	Effects against organisms or objects to be protected	None reported.		
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	No reference substa	nce was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEVAN FIELD CO	ICE OF THE RESULTS COMPAREI	ОТО
4.1	Reasons for	1 Precise condi	tions could be determined.	
	laboratory testing	2 Practical, acc	urate procedure.	
		Data generated is co obtained from the fi	nsidered relevant for field of use. Test ir eld.	nsects
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions			
4.3.1	Application method	The principle of fun sufficient period of target pest. There as to achieve this altho	igation is to confine a sufficient concentri ime to enable a toxic dose to be received re a number of ways in laboratory and fie ugh the principle is the same.	ration for a by the ld studies
4.3.2	Test organism	There are different l considered to be the	ife stages of <i>Anobium punctatum</i> . Eggs a stage which would require a higher dose	are of sulfuryl

Dow A RMS:	AgroSciences Sweden	April 2004 Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/30 Anobium punctatum Laboratory study (Ref. Z30)	
		fluoride compared to the other stages.	
4.3.3	Observed effect	The high mortality effect, recorded in the laboratory test is considered as the desired field response for eradication of eggs of <i>Anobium punctatum</i> .	
4.4	Relevance for read-across	Not applicable.	
		5 APPLICANT'S SUMMARY AND C	ONCLUSION
5.1	Materials and methods	Eggs of <i>Anobium punctatum</i> were fumigated wir 71 hours and 40 minutes at 16.8 °C and 85 % rel laboratory fumitoria. Bioassays from laboratory to EN 49.1 (1992) ("Holzschutzmittel - Bestimm Wirkung gegenüber <i>Anobium punctatum</i> (De Ge der Eiablage und des Überlebens von Larven - T Oberflächenbehandlung (Laboratoriumsverfahre determine LAD. Fumigant concentration was m Fumiscope gas analyser. Mortality rate was eva days after treatment.	th sulfuryl fluoride for lative humidity in y population according nung der vorbeugenden eer) durch Beobachten Teil 1: en)") were tested to neasured using a luated 85 days and 225
5.2	Reliability	Reliability indicator 2: Study conducted in accor accepted scientific principles, possibly with inco methodological deficiencies, which do not affec results	rdance with generally omplete reporting or t the quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this investigation was that under the high level of control of <i>Anobium punctatum</i> egg Additional trials have to be performed to unders the dose rates of the fumigant to achieve the LA stage at different temperatures.	e described conditions a s was achieved. tand the variability of D for this specific life
5.4	Conclusion	There are different life stages of <i>Anobium punct</i> . wooden structures. The laboratory fumigation to considered to be a valid and effective procedure efficacy of sulfuryl fluoride on the eggs of <i>A. pu</i> results showed that sulfuryl fluoride was highly pest species.	<i>atum</i> present in infested est undertaken was for evaluating the <i>unctatum</i> . The efficacy effective on eggs of this
5.5	Proposed efficacy specification	Control of eggs is excellent 100 % mortality at t 1788 g-h/m ³ at a temperature of 16.8 °C and 85	he evaluated LAD of % relative humidity.

	Evaluation by Competent Authorities
Date	EVALUATION BY RAPPORTEUR MEMBER STATE October 2004.
Comments	Field 2.3.7, The following is a revised version of the present entry: The untreated controls and treated eggs were kept and stored under the same incubation conditions before and after the test fumigations. These incubation conditions were: temperature 20 C, 75% relative humidity. The conditions during fumigation is given in Table 1.4 with the untreated controls remaining under incubation conditions of 20 °C, 75% relative humidity.
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).
Summary and conclusion	Applicant's version is adopted.

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population according to EN 49.1 (1992) ("Holzschutzmittel - Bestimmung der vorbeugenden Wirkung gegenüber Anobium punctatum (De Geer) durch Beobachten der Eiablage und des Überlebens von Larven - Teil 1: Oberflächenbehandlung (Laboratoriumsverfahren)").
Life stage	Eggs.
Mixed age population	Not applicable.
Number of eggs in test	874.

1.2	Test system
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Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, $40 \ge 25 \ge 14.5 \text{ cm} = 14.5$ litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 874 eggs on five boards of pine-wood (<i>Pinus silvestris</i> L.), ca. 100x40x10 mm according to EMPA ("Für Insektenversuche darf nur Kiefernsplintholz, gerade gewachsen, ohne Äste und arm an Harz verwendet werden. Mittleres Wachstum von 2.5-8 Jahrringe je cm. Der Anteil des Spätholzes an der Gesamtbreite der Jahrringe soll 30% nicht überschreiten. Das Holz darf weder chemisch behandelt noch geflößt oder mit Wärme behandelt
Dow AgroSciences April 2004 RMS: Sweden

Vikane

	sein; es muss lufttrocken und nicht länger als 5 Jahre gelagert sein.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitorium in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	Eggs All eggs were fumigated at a mean concentration of 25 g/m ³ for a total exposure period of 71 hours and 40 minutes leading to an accumulated dosage of 1788 g- h/m^3 .

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 16.8 °C.
Moisture	Fumigation was conducted at an average 85 % relative humidity.

Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/31 Anobium punctatum Field study (Ref. Z31)			
		1 REFERENCE: Z31, B5.10.2/31	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Franke, P. and ² Ultsch, R (2001).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² LGA, Landesgewerbeanstalt Bayern, Tillystr. 2, D-90431 Nürnberg, Germany			
		Field study on Anobium punctatum Number: LBM 541 1320/113.			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum / test organism	See Table 1.1.			

Dow A	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Section Annex TNsG: Pt III.	on B5.10.2 Point IIB5.10 Pt. I-B5.10, Cb. 6	Efficacy Data B5.10.2/31 And Field study (Pd	obium punctatum	
	-Cn. 0	Field Study (K	CI. ZJI)	
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	63 hours and 30 m	inutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls same conditions as	were included, these were kept and stored the treated larvae of <i>Anobium punctatum</i>	d under the
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulate determined 11 day	d dosage (LAD) expressed as g-h/m ³ . LA	D was
2.4.2	Method for recording / scoring of the effect	Larvae-mortality b treatment.	by examination (count) of dead larvae 11 c	lays after
2.4.3	Intervals of examination	11 days after treat	nent.	
2.4.4	Statistics	Post fumigation m number of dead lan after treatment.	ean total mortality was calculated by divid rvae by the total number of treated larvae	ling the 11 days
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESULT	ſS	
3.1	Efficacy	The percentage mo dead larvae by the	ortality was calculated by dividing the tota total number of treated larvae.	ll number of X

Percentage mortality of larvae of Anobium punctatum after

exposure to sulfuryl fluoride.			
	Control		
No.	Larvae	Dead larvae	
2	10	0	
Total mortality of untreated larvae: 0 %.			

	Treated larvae		
No.	Larvae	Dead larvae	
1	10	10	

Total mortality of treated larvae: 100 %.

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2	Efficacy Data		
Annex Point IIB5.10			

Annex Font HD510B5.10.2/31 Anobium punctatumTNsG: Pt. I-B5.10,B5.10.2/31 Anobium punctatumPt. III-Ch. 6Field study (Ref. Z31)

		- 1	
3.1.1	Dose/Efficacy curve	Not available from report.	
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 11 days after treatment.	
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.	
3.2	Effects against organisms or objects to be protected	None reported.	
3.3	Other effects	None reported.	
3.4	Efficacy of the reference substance	No reference substance was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.	
3.6	Efficacy limiting factors		
3.6.1	Occurrences of resistances	None reported.	
3.6.2	Other limiting factors	None reported.	
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS	
4.1	Reasons for laboratory testing	Not applicable.	
4.2	Intended actual scale of biocide application	Not applicable.	
4.3	Relevance compared to field conditions	Not applicable.	
4.3.1	Application method	Not applicable.	
4.3.2	Test organism	Not applicable.	
4.3.3	Observed effect	Not applicable.	
4.4	Relevance for read-across	Not applicable.	

5 APPLICANT'S SUMMARY AND CONCLUSION

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio Annex TNsG: Pt. III-	n B5.10.2 Point IIB5.10 Pt. I-B5.10, Ch. 6	Efficacy Data B5.10.2/31 Ano Field study (Re	obium punctatum ef. Z31)	
5.1	Materials and methods	Larvae of <i>Anobium</i> 63 hours and 30 mi 83.1 % relative hur (church of a volum were tested to deter using a Fumiscope after treatment.	a punctatum were fumigated with inutes at a temperature of 12.6 °C nidity in a practical fumigation ur e of 2400 m ³). Bioassays from la rmine LAD. Fumigant concentrat gas analyser. Mortality rate was	sulfuryl fluoride for and a moisture of nder field condition boratory population tion was measured evaluated 11 days
5.2	Reliability	Reliability indicato accepted scientific methodological det results.	or 2: Study conducted in accordance principles, possibly with incompl ficiencies, which do not affect the	ce with generally ete reporting or quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this in complete control of Additional trials ha the dose rates of th stage at different te	envestigation was that under the de f <i>Anobium punctatum</i> larvae was have to be performed to understand e fumigant to achieve the LAD for emperatures.	scribed conditions achieved. the variability of r this specific life
5.4	Conclusion	There are different wooden structures. to be a valid and ef sulfuryl fluoride or showed that sulfury species.	life stages of <i>Anobium punctatum</i> The field fumigation test underta fective procedure for evaluating t in the larvae of <i>A. punctatum</i> . The yl fluoride was highly effective or	a present in infested aken was considered he efficacy of efficacy results a larvae of this pest
5.5	Proposed efficacy specification	Total control of lar	vae of Anobium punctatum.	

	Evaluation by Competent Authorities		
	EVALUATION BY RAPPORTEUR MEMBER STATE		
Date	October 2004.		
Comments	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).		
Summary and conclusion	Applicant's version is adopted.		

1.1	Test organisms - Anobium punctatum	
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Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population.
Life stage	Larvae.
Mixed age population	Not applicable.
Number of larvae in test	10.

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 2400 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In totally 10 larvae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz- Spaltblock wurde mit 10 parasitenfreien, lebendigen Larven/Entwicklungsstadien des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan inside the structure.
Dosage rate	<u>Larvae</u> All larvae were fumigated at a mean concentration of 9.0 g/m^3 for a total exposure period of 63 hours and 30 minutes leading to an accumulated dosage of 570 g-h/m ³ .

Dow AgroSciences	April 2004	Vikane	Doc III-B5
RMS: Sweden			

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 12.6 °C.
Moisture	Fumigation was conducted at an average of 83.1 % relative humidity.

Sectio	n B5.10.2	.10.2 Efficacy Data	
Annex TNsG: Pt. III-	Annex Point IIB5.10B5.10.2/32 Anobium punctatumINsG: Pt. I-B5.10,Field study (Ref. Z32)		
		1 REFERENCE: Z32, B5.10.2/32	Official use only
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Franke, P. and ² Ultsch, R. (2001).	
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany	
		² LGA, Landesgewerbeanstalt Bayern, Tillystr. 2, D-90431 Nürnberg, Germany	
		Field study on Anobium punctatum Number: LBM 541 1320/116.	
1.2	Data protection	Yes.	
1.2.1	Data owner	Dow AgroSciences LLC.	
1.2.2	Companies with letter of Access	None.	
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I	
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.	
1.4	Deviations	Not applicable as the study not conducted to an international standard method.	
		2 METHOD	
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.	
2.1.1	Trade name/ proposed trade name	Vikane.	
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.	
2.1.3	Physical state and nature	Fumigant.	
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.	
2.1.5	Method of analysis	Not applicable.	
2.2	Reference substance	No reference substance was included in the study.	
2.2.1	Method of analysis for reference substance	Not applicable.	
2.3	Testing procedure		
2.3.1	Test population / inoculum / test organism	See Table 1.1.	

Dow AgroSciencesApril 2004VikaneRMS: Sweden		Vikane	Doc III-B5	
Section Annex	on B5.10.2 Point IIB5.10	Efficacy Data		
TNsG: Pt. III-	Pt. I-B5.10, Ch. 6	B5.10.2/32 Ano Field study (Re	bium punctatum ef. Z32)	
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	66 hours.		
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls were included, these were kept and stored under the same conditions as the treated larvae of <i>Anobium punctatum</i> .		der the
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulated determined after tre	dosage (LAD) expressed as g-h/m ³ . LAD was eatment.	as
2.4.2	Method for recording / scoring of the effect	Larvae-mortality by treatment.	y examination (count) of dead larvae 11 days	after
2.4.3	Intervals of examination	11 days after treatm	nent.	
2.4.4	Statistics	Post fumigation me number of dead lar after treatment.	ean total mortality was calculated by dividing vae by the total number of treated larvae 11 d	the ays
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESULT	S	
3.1	Efficacy	The percentage mo dead larvae by the	rtality was calculated by dividing the total nu total number of treated larvae	mber of X

Percentage mortality of larvae of *Anobium punctatum* after exposure to sulfuryl fluoride

exposure to sulfuryl fluoride.				
	Control			
No.	Larvae Dead larvae			
2	10	0		

Total mortality of untreated larvae: 0 %.

	Treated larvae		
No.	Larvae	Dead larvae	
1	10	10	

Total mortality of treated larvae: 100 %.

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5
Section B5 10 2	Efficacy Data		

Section D 5.10.2		Elikacy Data	
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/32 Anobium punctatum Field study (Ref. Z32)	
3.1.1	Dose/Efficacy curve	Not available from report.	
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 11 days after treatment.	
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.	
3.2	Effects against organisms or objects to be protected	None reported.	
3.3	Other effects	None reported.	
3.4	Efficacy of the reference substance	No reference substance was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.	
3.6	Efficacy limiting factors		
3.6.1	Occurrences of resistances	None reported.	
3.6.2	Other limiting factors	None reported.	
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS	
4.1	Reasons for laboratory testing	Not applicable.	
4.2	Intended actual scale of biocide application	Not applicable.	
4.3	Relevance compared to field conditions	Not applicable.	
4.3.1	Application method	Not applicable.	
4.3.2	Test organism	Not applicable.	
4.3.3	Observed effect	Not applicable.	
4.4	Relevance for read-across	Not applicable.	

5 APPLICANT'S SUMMARY AND CONCLUSION

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/32 And Field study (Re	obium punctatum ef. Z32)	
5.1	Materials and methods	Larvae of <i>Anobium</i> 66 hours at a tempe humidity in a pract volume of 3750 m ³ to determine LAD. Fumiscope gas ana treatment.	<i>a punctatum</i> were fumigated with erature of 12.1 °C and a moisture of ical fumigation under field condit). Bioassays from laboratory pop Fumigant concentration was mea- lyser. Mortality rate was evaluated	sulfuryl fluoride for of 82.2 % relative tion (church of a pulation were tested asured using a ed 11 days after
5.2	Reliability	Reliability indicato accepted scientific methodological det results.	or 2: Study conducted in accordance principles, possibly with incompletion ficiencies, which do not affect the	ce with generally ete reporting or quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this ir complete control of Additional trials ha the dose rates of th stage at different te	nvestigation was that under the de f <i>Anobium punctatum</i> larvae was ave to be performed to understand e fumigant to achieve the LAD for emperatures.	scribed conditions achieved. the variability of or this specific life
5.4	Conclusion	There are different wooden structures. to be a valid and ef sulfuryl fluoride or showed that sulfury species.	life stages of <i>Anobium punctatum</i> The field fumigation test underta fective procedure for evaluating t in the larvae of <i>A. punctatum</i> . The yl fluoride was highly effective or	<i>i</i> present in infested ken was considered he efficacy of efficacy results h larvae of this pest
5.5	Proposed efficacy specification	Total control of lar	vae of Anobium punctatum.	

	Evaluation by Competent Authorities		
	EVALUATION BY RAPPORTEUR MEMBER STATE		
Date	October 2004.		
Comments	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).		
Summary and conclusion	Applicant's version is adopted.		

1.1	Test organisms - Anobium punctatum
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Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population.
Life stage	Larvae.
Mixed age population	Not applicable.
Number of larvae in test	10.

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 3750 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 10 larvae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz- Spaltblock wurde mit 10 parasitenfreien, lebendigen Larven/Entwicklungsstadien des Gewöhnlichen Nagekäfers (Anobium punctatum) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details	
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the structure in its gaseous form.	
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan inside the structure.	
Dosage rate	<u>Larvae</u> All larvae were fumigated at a mean concentration of 9.1 g/m^3 for a total exposure period of 66 hours leading to an accumulated dosage of 599 g-h/m ³ .	

Dow AgroSciences	April 2004	Vikane	Doc III-B5
RMS: Sweden			

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 12.1 °C.
Moisture	Fumigation was conducted at an average of 82.2 % relative humidity.

Sectio	n B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/33 Anobium punctatum Field study (Ref. Z33)		
		1 REFERENCE: Z33, B5.10.2/33	Official use only	
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Franke, P. and ² Ultsch, R (1998).		
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany		
		² LGA, Landesgewerbeanstalt Bayern, Tillystr. 2, D-90431 Nürnberg, Germany		
		Field study on Anobium punctatum Number: MBP 548 1317/20.		
1.2	Data protection	Yes.		
1.2.1	Data owner	Dow AgroSciences LLC.		
1.2.2	Companies with letter of Access	None.		
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I		
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.		
1.4	Deviations	Not applicable as the study not conducted to an international standard method.		
		2 METHOD		
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.		
2.1.1	Trade name/ proposed trade name	Vikane.		
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.		
2.1.3	Physical state and nature	Fumigant.		
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.		
2.1.5	Method of analysis	Not applicable.		
2.2	Reference substance	No reference substance was included in the study.		
2.2.1	Method of analysis for reference substance	Not applicable.		
2.3	Testing procedure			
2.3.1	Test population / inoculum / test organism	See Table 1.1.		

Dow A	AgroSciences : Sweden	April 2004	Vikane Do	c III-B5
Section Annex	n B5.10.2 Efficacy Data Point IIB5.10			
TNsG: Pt. III-	Pt. 1-B5.10, Ch. 6	Field study (Ref. Z33)	
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		X
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	89 hours and 45	minutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated contro same conditions	Is were included, these were kept and stored under the as the treated larvae of <i>Anobium punctatum</i> .	
2.4	Examination			
2.4.1	Effect investigated	Lethal accumula determined 32 d	ted dosage (LAD) expressed as g-h/m ³ . LAD was ays after treatment.	
2.4.2	Method for recording / scoring of the effect	Larvae-mortality treatment.	by examination (count) of dead larvae 32 days after	
2.4.3	Intervals of examination	32 days after trea	atment.	
2.4.4	Statistics	Post fumigation number of dead after treatment.	mean total mortality was calculated by dividing the larvae by the total number of treated larvae 32 days	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESUI	TS	
3.1	Efficacy	The percentage i dead larvae by th	nortality was calculated by dividing the total number on total number of treated larvae.	of X

Percentage mortality of larvae of Anobium punctatum after

exposure to sulfuryl fluoride.				
Control				
No.	Larvae Dead larvae			
2	10 3			

	Treated larvae			
No.	Larvae Dead larvae			
1	10	10		

Total mortality of treated larvae: 100 %.

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5
Section P5 10 2	Efficient Data		

Section B5.10.2		Efficacy Data		
Annex I TNsG: 1 Pt. III-0	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/33 Anobium punctatum Field study (Ref. Z33)		
3.1.1	Dose/Efficacy curve	Not available from report.		
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 32 days after treatment.		
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.		
3.2	Effects against organisms or objects to be protected	None reported.		
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	No reference substance was used.		
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS		
4.1	Reasons for laboratory testing	Not applicable.		
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions	Not applicable.		
4.3.1	Application method	Not applicable.		
4.3.2	Test organism	Not applicable.		
4.3.3	Observed effect	Not applicable.		
4.4	Relevance for read-across	Not applicable.		

5 APPLICANT'S SUMMARY AND CONCLUSION

Dow RMS	AgroSciences S: Sweden	April 2004	Vikane	Doc III-B5
Secti	on B5.10.2	Efficacy Data		
Anne: TNsG Pt. III	x Point IIB5.10 : Pt. I-B5.10, I-Ch. 6	B5.10.2/33 Ano Field study (Re	bium punctatum ef. Z33)	
5.1	Materials and methods	Larvae of <i>Anobium</i> 89 hours and 45 mi 73.0 % relative hur (church of a volum were tested to deten using a Fumiscope after treatment.	<i>punctatum</i> were fumigated with nutes at a temperature of 16.0 °C nidity in a practical fumigation u e of 4200 m ³). Bioassays from la rmine LAD. Fumigant concentra gas analyser. Mortality rate was	sulfuryl fluoride for C and a moisture of nder field condition aboratory population ation was measured e evaluated 32 days
5.2	Reliability	Reliability indicato accepted scientific methodological def results.	r 2: Study conducted in accordar principles, possibly with incomp ficiencies, which do not affect the	nce with generally lete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this ir complete control of Additional trials ha the dose rates of the stage at different te	Ivestigation was that under the de f <i>Anobium punctatum</i> larvae was ive to be performed to understance e fumigant to achieve the LAD for emperatures.	escribed conditions achieved. d the variability of or this specific life
5.4	Conclusion	There are different wooden structures. to be a valid and ef sulfuryl fluoride on showed that sulfury species.	life stages of <i>Anobium punctatur</i> The field fumigation test undert fective procedure for evaluating the larvae of <i>A. punctatum</i> . The yl fluoride was highly effective o	<i>n</i> present in infested taken was considered the efficacy of e efficacy results n larvae of this pest
5.5	Proposed efficacy specification	Total control of lar	vae of Anobium punctatum.	
		Evaluation by	Competent Authorities	
		EVALUATION B	Y RAPPORTEUR MEMBER	STATE
Date		October 2004.		
Comments		Field 2.3.3. Table 1 concentration of <u>4.9</u>	1.3, dosage rate: All larvae were $\frac{9 \text{ g/m}^3}{2}$ leading to an accumu	fumigated at a mean lated dosage of <u>440 g-h/m³</u> .
		Field 3.1: Within the percentages (as stated	ted in the table legend above the	s are counts and not tables).
Sumn	nary and conclusion	Applicant's versior	i is adopted.	

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population.
Life stage	Larvae.
Mixed age population	Not applicable.
Number of larvae in test	10.

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 4200 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 10 larvae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz- Spaltblock wurde mit 10 parasitenfreien, lebendigen Larven/Entwicklungsstadien des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan inside the structure.
Dosage rate	<u>Larvae</u> All larvae were fumigated at a mean concentration of 5.1 g/m^3 for a total exposure period of 89 hours and 45 minutes leading to an accumulated dosage of 454 g-h/m ³ .

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 16.0 °C.
Moisture	Fumigation was conducted at an average of 73.0 % relative humidity.

Section B5.10.2Efficacy DataAnnex Point IIB5.10TNsG: Pt. I-B5.10,B5.10.2/34 Anobium punctatumPt. III-Ch. 6Field study (Ref. Z34)		Efficacy Data		
		B5.10.2/34 Anobium punctatum Field study (Ref. Z34)		
		1 REFERENCE: Z34, B5.10.2/34	Official use only	
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Franke, P. and ² Ultsch, R. (1998).		
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany		
		² LGA, Landesgewerbeanstalt Bayern, Tillystr. 2, D-90431 Nürnberg, Germany		
		Field study on Anobium punctatum Number: MBP 548 1317/32.		
1.2	Data protection	Yes.		
1.2.1	Data owner	Dow AgroSciences LLC.		
1.2.2	Companies with letter of Access	None.		
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I		
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.		
1.4	Deviations	Not applicable as the study not conducted to an international standard method.		
		2 METHOD		
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.		
2.1.1	Trade name/ proposed trade name	Vikane.		
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.		
2.1.3	Physical state and nature	Fumigant.		
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.		
2.1.5	Method of analysis	Not applicable.		
2.2	Reference substance	No reference substance was included in the study.		
2.2.1	Method of analysis for reference substance	Not applicable.		
2.3	Testing procedure			
2.3.1	Test population / inoculum /	See Table 1.1.		

Dow A	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III	Point 1185.10 Pt. I-B5.10, ·Ch. 6	B5.10.2/34 Anol Field study (Ref	oium punctatum f. Z34)	
	test organism			
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	66 hours and 49 mir	nutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls ware conditions as t	vere included, these were kept and store the treated larvae of <i>Anobium punctatur</i>	ed under the <i>m</i> .
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulated determined 17 days	dosage (LAD) expressed as g-h/m ³ . LA after treatment.	AD was
2.4.2	Method for recording / scoring of the effect	Larvae-mortality by treatment.	examination (count) of dead larvae 17	days after
2.4.3	Intervals of examination	17 days after treatm	ent.	
2.4.4	Statistics	Post fumigation meanumber of dead larvater treatment.	an total mortality was calculated by div are by the total number of treated larvae	iding the e 17 days
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESULTS	, ,	
3.1	Efficacy	The percentage mor dead larvae by the to	tality was calculated by dividing the to otal number of treated larvae.	tal number of X

Percentage mortality of larvae of *Anobium punctatum* after exposure to sulfuryl fluoride.

	Control		
No.	Larvae	Dead larvae	
2	10	4	

Total mortality of untreated larvae: 40 %.

	Treated larvae		
No.	Larvae	Dead larvae	
1	10	10	

Total mortality of treated larvae: 100 %.

Section B5.10.2		Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/34 Anobium punctatum Field study (Ref. Z34)		
3.1.1	Dose/Efficacy curve	Not available from report.		
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 17 days after treatment.		
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.		
3.2	Effects against organisms or objects to be protected	None reported.		
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	No reference substance was used.		
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS		
4.1	Reasons for laboratory testing	Not applicable.		
4.2	Intended actual scale of biocide application	Not applicable.		
4.3	Relevance compared to field conditions	Not applicable.		
4.3.1	Application method	Not applicable.		
4.3.2	Test organism	Not applicable.		
4.3.3	Observed effect	Not applicable.		
4.4	Relevance for read-across	Not applicable.		

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5	
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/34 Anobium punctatum Field study (Ref. Z34)			
		5 APPLIC	ANT'S SUMMARY AND CON	ICLUSION	
5.1	Materials and methods	Larvae of <i>Anobiun</i> 66 hours and 49 m relative humidity i of a volume of 14: tested to determine a Fumiscope gas a treatment.	<i>n punctatum</i> were fumigated with ninutes at a temperature of 16.0°C in a practical fumigation under fu- 50 m ³). Bioassays from laborator e LAD. Fumigant concentration nalyser. Mortality rate was evaluated	h sulfuryl fluoride for C and a 71.2 % eld condition (church ry population were was measured using uated 17 days after	
5.2	Reliability	Reliability indicat accepted scientific methodological de results.	or 2: Study conducted in accorda principles, possibly with incomp ficiencies, which do not affect th	nce with generally plete reporting or he quality of relevant	
5.3	Assessment of efficacy, data analysis and interpretation	The result of this i complete control of Additional trials h the dose rates of th stage at different t	nvestigation was that under the d of <i>Anobium punctatum</i> larvae was ave to be performed to understan ne fumigant to achieve the LAD t emperatures.	lescribed conditions s achieved. Id the variability of for this specific life	
5.4	Conclusion	There are differen wooden structures to be a valid and e sulfuryl fluoride o showed that sulfur species.	t life stages of <i>Anobium punctatu</i> . The field fumigation test under ffective procedure for evaluating n the larvae of <i>A. punctatum</i> . The ryl fluoride was highly effective of	m present in infested taken was considered the efficacy of e efficacy results on larvae of this pest	
5.5	Proposed efficacy specification	Total control of la	rvae of Anobium punctatum.		

	Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	October 2004.	
Comments	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).	
Summary and conclusion	Applicant's version is adopted.	

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population.
Life stage	Larvae.
Mixed age population	Not applicable.
Number of larvae in test	10.

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 1450 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 10 larvae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz- Spaltblock wurde mit 10 parasitenfreien, lebendigen Larven/Entwicklungsstadien des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan inside the structure.
Dosage rate	<u>Larvae</u> All larvae were fumigated at a mean concentration of 6.5 g/m^3 for a total exposure period of 66 hours and 49 minutes leading to an accumulated dosage of 434 g-h/m ³ .

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 16.0 °C.
Moisture	Fumigation was conducted at an average of 71.2 % relative humidity.

Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B.10.2/35 Anobium punctatum Field study (Ref. Z35)		
		1 REFERENCE: Z35, B.10.2/35	Official use only	
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Franke, P. and ² Ultsch, R. (2000).		
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany		
		² LGA, Landesgewerbeanstalt Bayern, Tillystr. 2, D-90431 Nürnberg, Germany		
		Field study on Anobium punctatum Number: LBM 540 1336/30.		
1.2	Data protection	Yes.		
1.2.1	Data owner	Dow AgroSciences LLC.		
1.2.2	Companies with letter of Access	None.		
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I		
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.		
1.4	Deviations	Not applicable as the study not conducted to an international standard method.		
		2 METHOD		
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.		
2.1.1	Trade name/ proposed trade name	Vikane.		
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.		
2.1.3	Physical state and nature	Fumigant.		
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.		
2.1.5	Method of analysis	Not applicable.		
2.2	Reference substance	No reference substance was included in the study.		
2.2.1	Method of analysis for reference substance	Not applicable.		
2.3	Testing procedure			
2.3.1	Test population / inoculum / test organism	See Table 1.1.		

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc I	II-B5
Section B5.10.2 Annex Point IIB5.10		Efficacy Data	ium nunctatum		
TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Field study (Re	f. Z35)		
2.3.2	Test system	See Table 1.2.			
2.3.3	Application of TS	See Table 1.3.			Х
2.3.4	Test conditions	See Table 1.4.			
2.3.5	Duration of the test / Exposure time	65 hours.			
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	Untreated controls same conditions as	were included, these were kept and stored the treated larvae of <i>Anobium punctatum</i> .	l under the	
2.4	Examination				
2.4.1	Effect investigated	Lethal accumulated determined 13 days	dosage (LAD) expressed as g-h/m ³ . LAI after treatment.	D was	
2.4.2	Method for recording / scoring of the effect	Larvae-mortality by treatment.	v examination (count) of dead larvae 13 d	ays after	
2.4.3	Intervals of examination	13 days after treatm	nent.		
2.4.4	Statistics	Post fumigation me number of dead larv after treatment.	an total mortality was calculated by divid vae by the total number of treated larvae	ling the 13 days	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.			
		3 RESULTS	5		
3.1	Efficacy	The percentage more dead larvae by the t	rtality was calculated by dividing the tota otal number of treated larvae.	l number of	Х

Percentage mortality of larvae of Anobium punctatum after

exposure to sulfuryl fluoride.				
	Control			
No.	Larvae	Dead larvae		
2	10	0		
Total mortality of untreated larvae: 0 %.				

	Treated larvae		
No.	Larvae	Dead larvae	
1	10	10	

Total mortality of treated larvae: 100 %.

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data		
		B.10.2/35 Anobium punctatum Field study (Ref. Z35)		
3.1.1	Dose/Efficacy curve	Not available from report.		
3.1.2	Begin and duration of effects	A mortality of 100 %	% was achieved 13 days after treatment.	
3.1.3	Observed effects in the post monitoring phase	No unusual effect ol	bserved.	
3.2	Effects against organisms or objects to be protected	None reported.		
3.3	Other effects	None reported.		
3.4	Efficacy of the reference substance	No reference substan	nce was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.		
3.6	Efficacy limiting factors			
3.6.1	Occurrences of resistances	None reported.		
3.6.2	Other limiting factors	None reported.		
		4 RELEVAN FIELD CC	NCE OF THE RESULTS COMPAREI ONDITIONS	D ТО

4.1	Reasons for laboratory testing	Not applicable.
4.2	Intended actual scale of biocide application	Not applicable.
4.3	Relevance compared to field conditions	Not applicable.
4.3.1	Application method	Not applicable.
4.3.2	Test organism	Not applicable.
4.3.3	Observed effect	Not applicable.
4.4	Relevance for read-across	Not applicable.
		5 APPLICANT'S SUMMARY AND CONCLUSION

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Section B5.10.2		Efficacy Data		
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B.10.2/35 Anol Field study (Re	oium punctatum ef. Z35)	
5.1	Materials and methods	Larvae of <i>Anobium</i> 65 hours at a tempo practical fumigatio m ³). Bioassays fro LAD. Fumigant co analyser. Mortality	<i>a punctatum</i> were fumigated with erature of 20.3°C and a 54.0 % re in under field condition (church com laboratory population were tess poncentration was measured using y rate was evaluated 13 days afte	a sulfuryl fluoride for elative humidity in a of a volume of 4350 sted to determine a Fumiscope gas r treatment.
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordan principles, possibly with incomp ficiencies, which do not affect the	nce with generally lete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this in complete control o Additional trials ha the dose rates of th stage at different te	nvestigation was that under the d f Anobium punctatum larvae was ave to be performed to understand e fumigant to achieve the LAD f emperatures.	escribed conditions a achieved. d the variability of for this specific life
5.4	Conclusion	There are different wooden structures. to be a valid and ef sulfuryl fluoride or showed that sulfur species.	life stages of <i>Anobium punctatur</i> . The field fumigation test under ffective procedure for evaluating in the larvae of <i>A. punctatum</i> . The yl fluoride was highly effective o	<i>n</i> present in infested taken was considered the efficacy of e efficacy results n larvae of this pest
5.5	Proposed efficacy specification	Total control of lar	vae of Anobium punctatum.	

	Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	October 2004.	
Comments	2.3.3. Table 1.3, dosage rate All larvae were fumigated at a mean concentration of $5.5 \text{ g/m}^3 \dots$ leading to an accumulated dosage of 358 g-h/m^3 .	
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).	
Summary and conclusion	Applicant's version is adopted.	

1.1 Test organisms - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population.
Life stage	Larvae.
Mixed age population	Not applicable.
Number of larvae in test	10.

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 4350 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 10 larvae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz- Spaltblock wurde mit 10 parasitenfreien, lebendigen Larven/Entwicklungsstadien des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan inside the structure.
Dosage rate	<u>Larvae</u> All larvae were fumigated at a mean concentration of 5.8 g/m ³ for a total exposure period of 65 hours leading to an accumulated dosage of 376 g-h/m ³ .

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 20.3 °C.
Moisture	Fumigation was conducted at an average of 54.0% relative humidity.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/36 Anobium punctatum Field study (Ref. Z36)			
		1 REFERENCE: Z36, B.10.2/36	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G., ² Franke, P. and ² Ultsch, R. (2000).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² LGA, Landesgewerbeanstalt Bayern, Tillystr. 2, D-90431 Nürnberg, Germany			
		Field study on Anobium punctatum Number: LBM 540 1336/37.			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum / test organism	See Table 1.1.			

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/36 Ano Field study (Re	bium punctatum f. Z36)	
		• `	^	
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	62 hours.		
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls same conditions as	were included; these were kept and stored under the treated larvae of <i>Anobium punctatum</i> .	er the
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulated determined 12 days	dosage (LAD) expressed as g-h/m ³ . LAD was after treatment.	
2.4.2	Method for recording / scoring of the effect	Larvae-mortality by treatment.	v examination (count) of dead larvae 12 days at	fter
2.4.3	Intervals of examination	12 days after treatm	ient.	
2.4.4	Statistics	Post fumigation me number of dead larv after treatment.	an total mortality was calculated by dividing the vae by the total number of treated larvae 12 day	ne /S
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.		
		3 RESULTS	S	
3.1	Efficacy	The percentage more dead larvae by the t	rtality was calculated by dividing the total num total number of treated larvae.	ber of X

Percentage mortality of larvae of *Anobium punctatum* after exposure to sulfuryl fluoride.

exposure to sulfuryl fluoride.				
	Control			
No.	Larvae Dead larvae			
2 10 0				
Total montality of untrooted lamage 0.0/				

Total mortality of untreated lar	vae: 0 %.
----------------------------------	-----------

	Treated larvae		
No.	Larvae	Dead larvae	
1	10	10	

Total mortality of treated larvae: 100 %.

Dow AgroSciences RMS: Sweden	April 2004	Vikane	Doc III-B5
Section B5 10 2	Efficacy Data		

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/36 Anobium punctatum Field study (Ref. Z36)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 12 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for laboratory testing	Not applicable.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions	Not applicable.			
4.3.1	Application method	Not applicable.			
4.3.2	Test organism	Not applicable.			
4.3.3	Observed effect	Not applicable.			
4.4	Relevance for read-across	Not applicable.			

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5	
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/36 Anobium punctatum Field study (Ref. Z36)			
5.1	Materials and	5 APPLIC Larvae of <i>Anobiu</i>	CANT'S SUMMARY AND CONC <i>m punctatum</i> were fumigated with s	LUSION ulfuryl fluoride for	
	methods	practical fumigati m ³). Bioassays fr LAD. Fumigant analyser. Mortali	ion under field condition (church of a rom laboratory population were tested concentration was measured using a ity rate was evaluated 12 days after t	a volume of 3000 ed to determine Fumiscope gas reatment.	
5.2	Reliability	Reliability indica accepted scientifi methodological d results.	tor 2: Study conducted in accordance c principles, possibly with incomple efficiencies, which do not affect the o	e with generally te reporting or quality of relevant	
5.3	Assessment of efficacy, data analysis and interpretation	The result of this complete control Additional trials I the dose rates of t stage at different	investigation is that under the descri of <i>Anobium punctatum</i> larvae was a have to be performed to understand t the fumigant to achieve the LAD for temperatures.	bed conditions chieved. he variability of this specific life	
5.4	Conclusion	There are differen wooden structure to be a valid and sulfuryl fluoride of showed that sulfu species.	At life stages of <i>Anobium punctatum</i> s. The field fumigation test undertal effective procedure for evaluating the point he larvae of <i>A. punctatum</i> . The e- rryl fluoride was highly effective on	present in infested cen was considered e efficacy of efficacy results larvae of this pest	
5.5	Proposed efficacy specification	Total control of la	arvae of Anobium punctatum.		

	Evaluation by Competent Authorities			
	EVALUATION BY RAPPORTEUR MEMBER STATE			
Date	October 2004.			
Comments	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).			
Summary and conclusion	Applicant's version is adopted.			

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population.
Life stage	Larvae.
Mixed age population	Not applicable.
Number of larvae in test	10.

1.1 Test organisms - Anobium punctatum

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 3000 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	In total 10 larvae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz- Spaltblock wurde mit 10 parasitenfreien, lebendigen Larven/Entwicklungsstadien des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan inside the structure.
Dosage rate	<u>Larvae</u> All larvae were fumigated at a mean concentration of 7.2 g/m ³ for a total exposure period of 62 hours leading to an accumulated dosage of 446 g-h/m ³ .

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 18.6 °C.
Moisture	Fumigation was conducted at an average of 75.7 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/37 Anobium punctatum Laboratory study (Ref. Z37)			
			0.001.1.1		
		1 REFERENCE: Z37, B5.10.2/37	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G. and ² Franke P. (1998).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² Von der IHK Nürnberg öffentlich bestellte und vereidigte Sachverständige für Vorratsschädlinge und biologische Schäden am Holz, Hohe Linde 2, D-90607 Rückersdorf, Germany			
		Laboratory study on Anobium punctatum Number: 121.08.1998 No. 1.			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III	[-B5
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/37 Anobi Laboratory study	um punctatum y (Ref. Z37)		
	test organism				
2.3.2	Test system	See Table 1.2.			
2.3.3	Application of TS	See Table 1.3.			
2.3.4	Test conditions	See Table 1.4.			
2.3.5	Duration of the test / Exposure time	31 hours and 35 minu	tes.		
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	Untreated controls we same conditions as the	e treated pupae of <i>A. punctatum</i> .	stored under the	
2.4	Examination				
2.4.1	Effect investigated	Lethal accumulated d determined 3 days aft	osage (LAD) expressed as g-h/m ³ . er treatment and finally 28 days at	The LAD was treatment.	
2.4.2	Method for recording / scoring of the effect	Pupae mortality by expupae 3 days after tre	amination (count) of beetles hatch atment and finally 28 days after tr	ned from treated eatment.	
2.4.3	Intervals of examination	3 days after treatment	and finally 28 days after treatment	ıt.	
2.4.4	Statistics	Post fumigation mear number of dead pupa- treatment and finally	total mortality was calculated by by the total number of treated pu 28 days after treatment.	dividing the pae 3 days after	
2.4.5	Post fumigation monitoring of the test organism	The total mortality-ef days after treatment a	fect of sufuryl fluoride on pupae w nd finally 28 days after treatment.	vas determined 3	
		3 RESULTS			
3.1	Efficacy	The percentage morta dead pupae by the tot	lity was calculated by dividing the al number of treated pupae.	e total number of X	K

Percentage mortality of pupae of Anobium punctatum 3	days
after exposure to sulfuryl fluoride	

А	Untreated Control			
No.	Pupae	beetles hatched	Living pupae	Dead pupae
K	10	2	8	0

Total mortality of untreated pupae: 0 %

В	Treated pupae			
No.	Pupae	beetles hatched	Living pupae	Dead pupae
1	10	0	0	10

Total mortality of treated pupae: 100 %

Percentage mortality of pupae of *Anobium punctatum* 28 days after exposure to sulfuryl fluoride

A	Untreated Control				
No.	Pupae	beetles hatched	Living pupae	Dead pupae	
K	10	8	0	2	

Total mortality of untreated pupae: 20 %

В	Treated pupae				
No.	Pupae	beetles hatched	Living pupae	Dead pupae	
1	10	0	0	10	

Total mortality of treated pupae: 100 %
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/37 Anobium punctatum Laboratory study (Ref. Z37)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 28 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1 Precise conditions could be determined.			
	laboratory testing	2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Pupae are considered to be a stage which would require a higher dose of sulfuryl			

Dow AgroSciences RMS: Sweden		April 2004	Vikane	Doc III-B5
Section B5.10.2		Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/37 And Laboratory stu	obium punctatum 1dy (Ref. Z37)	
		fluoride compared	to larvae.	
4.3.3	Observed effect	The complete mor considered as the c <i>Anobium punctatu</i>	tality effect, recorded in the laborates the laborates of the laborates of the laborate of the laborate of the laborates of t	atory test is ion of pupae of
4.4	Relevance for read-across	Not applicable.		
		5 APPLIC	ANT'S SUMMARY AND CON	CLUSION
5.1	Materials and methods	Pupae of <i>Anobium</i> 31 hours and 35 m humidity in labora were tested to dete using a Fumiscope after treatment and	<i>punctatum</i> were fumigated with s inutes at a temperature of 11.5 °C tory fumitoria. Bioassays from la ermine LAD. Fumigant concentra e gas analyser. Mortality rate was 1 28 days after treatment.	sulfuryl fluoride for and 58 % relative boratory population tion was measured evaluated 3 days
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordan principles, possibly with incomple ficiencies, which do not affect the	ce with generally lete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this i complete control of Additional trials he the dose rates of the stage at different to	nvestigation was that under the de of <i>Anobium punctatum</i> pupae was ave to be performed to understand be fumigant to achieve the LAD for emperatures.	escribed conditions achieved. I the variability of or this specific life
5.4	Conclusion	There are different wooden structures considered to be a efficacy of sulfury results showed tha this pest species.	t life stages of <i>Anobium punctatum</i> . The laboratory fumigation test uvalid and effective procedure for 1 fluoride on the pupae of <i>A. punc</i> t sulfuryl fluoride was highly effe	<i>n</i> present in infested indertaken was evaluating the <i>tatum</i> . The efficacy ctive on pupae of
5.5	Proposed efficacy specification	Total control of pu	pae of Anobium punctatum.	

	Evaluation by Competent Authorities		
EVALUATION BY RAPPORTEUR MEMBER STATE			
Date	October 2004.		
Comments	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).		
Summary and conclusion	Applicant's version is adopted.		

1.1 Test organism - Anobium puntatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	10 pupae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz-Spaltblock wurde mit 10 parasitenfreien, lebendigen Puppen des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Life stage	Pupae.
Mixed age population	Not applicable.
Number of pupae in test	10.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	10 pupae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz-Spaltblock wurde mit 10 parasitenfreien, lebendigen Puppen des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas-analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitoria in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	<u>Pupae</u> All pupae were fumigated at 26.6 g/m ³ for a total exposure period of 31 hours and 35 minutes leading to an accumulated dosage of 839 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 11.5°C.
Moisture	Fumigation was conducted at an average 58 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/38 Anobium punctatum Laboratory study (Ref. Z38)			
			0.000 1.1		
		1 REFERENCE: Z38, B5.10.2/38	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G. and ² Franke P. (1998).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² Von der IHK Nürnberg öffentlich bestellte und vereidigte Sachverständige für Vorratsschädlinge und biologische Schäden am Holz, Hohe Linde 2, D-90607 Rückersdorf, Germany			
		Laboratory study on Anobium punctatum Number: 121.08.1998 No. 2.			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow AgroSciences RMS: Sweden		April 2004 Vikane	Doc III-B5
Section B5.10.2		Efficacy Data	
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/38 Anobium punctatum Laboratory study (Ref. Z38)	
	test organism		
2.3.2	Test system	See Table 1.2.	
2.3.3	Application of TS	See Table 1.3.	
2.3.4	Test conditions	See Table 1.4.	
2.3.5	Duration of the test / Exposure time	31 hours and 10 minutes.	
2.3.6	Number of replicates performed	One.	
2.3.7	Controls	Untreated controls were included, these were kept and stored u same conditions as the treated pupae of <i>A. punctatum</i> .	nder the
2.4	Examination		
2.4.1	Effect investigated	Lethal accumulated dosage (LAD) expressed as g-h/m ³ . The L determined 3 days after treatment and finally 28 days after trea	AD was tment.
2.4.2	Method for recording / scoring of the effect	Pupae mortality by examination (count) of beetles hatched from pupae 3 days after treatment and finally 28 days after treatment	n treated t.
2.4.3	Intervals of examination	3 days after treatment and finally 28 days after treatment.	
2.4.4	Statistics	Post fumigation mean total mortality was calculated by dividin number of dead pupae by the total number of treated pupae 3 d treatment and finally 28 days after treatment.	g the ays after

2.4.5 Post fumigation monitoring of the test organism The total mortality-effect of sufuryl fluoride on pupae was determined 3 days after treatment and finally 28 days after treatment.

3 **RESULTS**

3.1 Efficacy The percentage mortality was calculated by dividing the total number of X dead pupae by the total number of treated pupae.

Percentage mortality of pupae of Anobium punctatum 3 days
after exposure to sulfuryl fluoride

A	Untreated Control			
No.	Pupae	beetles hatched	Living pupae	Dead pupae
K	10	2	8	0

Total mortality of untreated pupae: 0 %

В	Treated pupae			
No.	Pupae	beetles hatched	Living pupae	Dead pupae
2	10	0	1	9

Total mortality of treated pupae: 90 %

Percentage mortality of pupae of *Anobium punctatum* 28 days after exposure to sulfuryl fluoride

A	Untreated Control			
No.	Pupae	beetles batched	Living	Dead
		natcheu	pupae	pupae
K	10	8	0	2

Total mortality of untreated pupae: 20 %

В	Treated pupae			
No.	Pupae beetles Living Dea hatched pupae pup			
1	10	0	0	10

Total mortality of treated pupae: 100 %

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/38 Anobium punctatum Laboratory study (Ref. Z38)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 28 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1 Precise conditions could be determined.			
	laboratory testing	2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Pupae are considered to be a stage which would require a higher dose of sulfuryl			

Dow A RMS:	AgroSciences Sweden	ices April 2004 Vikane Doc		Doc III-B5
Sectio	n B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/38 Anobium punctatum Laboratory study (Ref. Z38)		
		fluoride compared	to larvae.	
4.3.3	Observed effect	The complete mor considered as the considered as the construct and	tality effect, recorded in the laborates desired field response for eradicati <i>m</i> .	atory test is on of pupae of
4.4	Relevance for read-across	Not applicable.		
		5 APPLIC	ANT'S SUMMARY AND CON	CLUSION
5.1	Materials and methods	Pupae of <i>Anobium</i> 31 hours and 10 m humidity in labora were tested to dete using a Fumiscope after treatment and	<i>punctatum</i> were fumigated with s inutes at a temperature of 11.5°C a tory fumitoria. Bioassays from la ermine LAD. Fumigant concentrate gas analyser. Mortality rate was 128 days after treatment.	sulfuryl fluoride for and 58 % relative boratory population tion was measured evaluated 3 days
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordan principles, possibly with incompl ficiencies, which do not affect the	ce with generally ete reporting or quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this i complete control of Additional trials has the dose rates of the stage at different to	nvestigation was that under the de of <i>Anobium punctatum</i> pupae was ave to be performed to understand be fumigant to achieve the LAD for emperatures.	scribed conditions achieved. the variability of or this specific life
5.4	Conclusion	There are different wooden structures considered to be a efficacy of sulfury results showed tha this pest species.	t life stages of <i>Anobium punctatum</i> . The laboratory fumigation test uvalid and effective procedure for a l fluoride on the pupae of <i>A. punct</i> t sulfuryl fluoride was highly effected	<i>n</i> present in infested indertaken was evaluating the <i>tatum</i> . The efficacy ctive on pupae of
5.5	Proposed efficacy specification	Total control of pu	pae of Anobium punctatum.	

	Evaluation by Competent Authorities		
	EVALUATION BY RAPPORTEUR MEMBER STATE		
Date	October 2004.		
Comments	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).		
Summary and conclusion	Applicant's version is adopted.		

1.1 Test organism - Anobium puntatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	10 pupae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz-Spaltblock wurde mit 10 parasitenfreien, lebendigen Puppen des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Life stage	Pupae.
Mixed age population	Not applicable.
Number of pupae in test	10.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	10 pupae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz-Spaltblock wurde mit 10 parasitenfreien, lebendigen Puppen des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas-analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitoria in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	<u>Pupae</u> All pupae were fumigated at 15.0 g/m ³ for a total exposure period of 31 hours and 10 minutes leading to an accumulated dosage of 466 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 11.5 °C.
Moisture	Fumigation was conducted at an average 58 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex TNsG: Pt. III-	nex Point IIB5.10B5.10.2/39 Anobium punctatumsG: Pt. I-B5.10,B5.10.2/39 Anobium punctatumIII-Ch. 6Laboratory study (Ref. Z39)				
		1 REFERENCE: Z39, B5.10.2/39	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G. and ² Franke P. (1998).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² Von der IHK Nürnberg öffentlich bestellte und vereidigte Sachverständige für Vorratsschädlinge und biologische Schäden am Holz, Hohe Linde 2, D-90607 Rückersdorf, Germany			
		Laboratory study on Anobium punctatum Number: 121.08.1998 No. 3.			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow A	AgroSciences : Sweden	April 2004	Vikane D	oc III-B5
Sectio	on B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, •Ch. 6	B5.10.2/39 An Laboratory st	obium punctatum udy (Ref. Z39)	
	test organism			
2.3.2	Test system	See Table 1.2.		
2.3.3	Application of TS	See Table 1.3.		
2.3.4	Test conditions	See Table 1.4.		
2.3.5	Duration of the test / Exposure time	30 hours and 47 m	ninutes.	
2.3.6	Number of replicates performed	One.		
2.3.7	Controls	Untreated controls same conditions a	s were included, these were kept and stored under t s the treated pupae of <i>A. punctatum</i> .	he
2.4	Examination			
2.4.1	Effect investigated	Lethal accumulate determined 3 days	ed dosage (LAD) expressed as g-h/m ³ . The LAD we after treatment and finally 28 days after treatment	/as
2.4.2	Method for recording / scoring of the effect	Pupae mortality by pupae 3 days after	y examination (count) of beetles hatched from trea treatment and finally 28 days after treatment.	ted
2.4.3	Intervals of examination	3 days after treatm	nent and finally 28 days after treatment.	
2.4.4	Statistics	Post fumigation m number of dead pu treatment and fina	tean total mortality was calculated by dividing the apae by the total number of treated pupae 3 days at 11y 28 days after treatment.	ter
2.4.5	Post fumigation monitoring of the test organism	The total mortality days after treatme	y-effect of sufuryl fluoride on pupae was determine nt and finally 28 days after treatment.	ed 3
		3 RESULT	rs	
3.1	Efficacy	The percentage me dead pupae by the	ortality was calculated by dividing the total numbe total number of treated pupae.	r of X

Percentage mortality of pupae of *Anobium punctatum* 3 days after exposure to sulfuryl fluoride

A	Untreated Control			
No.	Pupae	beetles hatched	Living pupae	Dead pupae
K	10	2	8	0

Total mortality of untreated pupae: 0 %

В	Treated pupae			
No.	Pupae	beetles hatched	Living pupae	Dead pupae
1	10	0	2	8

Total mortality of treated pupae: 80 %

Percentage mortality of pupae of *Anobium punctatum* 28 days after exposure to sulfuryl fluoride

A	Untreated Control			
No.	Pupae	beetles	Living	Dead
		hatched	pupae	pupae
K	10	8	0	2

Total mortality of untreated pupae: 20 %

В	Treated pupae			
No.	Pupae	beetles hatched	Living pupae	Dead pupae
1	10	0	0	10

Total mortality of treated pupae: 100 %

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/39 Anobium punctatum Laboratory study (Ref. Z39)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 28 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1 Precise conditions could be determined.			
	laboratory testing	2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Pupae are considered to be a stage which would require a higher dose of sulfuryl			

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio	n B5.10.2	Efficacy Data		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/39 Anobium punctatum Laboratory study (Ref. Z39)		
		fluoride compared	to larvae.	
4.3.3	Observed effect	The complete mort considered as the considered as the constant of the constant	tality effect, recorded in the labora lesired field response for eradication.	tory test was on of pupae of
4.4	Relevance for read-across	Not applicable.		
		5 APPLICA	ANT'S SUMMARY AND CONC	CLUSION
5.1	Materials and methods	Pupae of <i>Anobium</i> 30 hours and 47 m humidity in laborative were tested to dete using a Fumiscope after treatment and	<i>punctatum</i> were fumigated with s inutes at a temperature of 11.5 °C tory fumitoria. Bioassays from lal rmine LAD. Fumigant concentrat gas analyser. Mortality rate was 28 days after treatment.	ulfuryl fluoride for and 58 % relative poratory population ion was measured evaluated 3 days
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordance principles, possibly with incomple ficiencies, which do not affect the	ce with generally ete reporting or quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this in complete control o Additional trials ha the dose rates of th stage at different to	nvestigation was that under the dest f <i>Anobium punctatum</i> pupae was a ave to be performed to understand be fumigant to achieve the LAD fo emperatures.	scribed conditions achieved. the variability of r this specific life
5.4	Conclusion	There are different wooden structures. considered to be a efficacy of sulfury results showed that this pest species.	life stages of <i>Anobium punctatum</i> . The laboratory fumigation test up valid and effective procedure for el fluoride on the pupae of <i>A. punct</i> t sulfuryl fluoride was highly effect	e present in infested ndertaken was evaluating the <i>catum</i> . The efficacy ctive on pupae of
5.5	Proposed efficacy specification	Total control of pu	pae of Anobium punctatum.	

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).
Summary and conclusion	Applicant's version is adopted.

1.1 Test organism - Anobium puntatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	10 pupae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz-Spaltblock wurde mit 10 parasitenfreien, lebendigen Puppen des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Life stage	Pupae.
Mixed age population	Not applicable.
Number of pupae in test	10.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	10 pupae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz-Spaltblock wurde mit 10 parasitenfreien, lebendigen Puppen des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas-analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitoria in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	<u>Pupae</u> All pupae were fumigated at 17.3 g/m ³ for a total exposure period of 30 hours and 47 minutes leading to an accumulated dosage of 532 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 11.5 °C.
Moisture	Fumigation was conducted at an average 58 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/40 Anobium punctatum Laboratory study (Ref. Z40)			
			Official		
		1 REFERENCE: Z40, B5.10.2/40	use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G. and ² Franke P. (1998).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² Von der IHK Nürnberg öffentlich bestellte und vereidigte Sachverständige für Vorratsschädlinge und biologische Schäden am Holz, Hohe Linde 2, D-90607 Rückersdorf, Germany			
		Laboratory study on Anobium punctatum Number: 121.08.1998 No. 4.			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				
2.3.1	Test population / inoculum /	See Table 1.1.			

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc 1	III-B5
Sectio	on B5.10.2	Efficacy Data	L		
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/40 Ar Laboratory st	nobium punctatum tudy (Ref. Z40)		
	test organism				
2.3.2	Test system	See Table 1.2.			
2.3.3	Application of TS	See Table 1.3.			Х
2.3.4	Test conditions	See Table 1.4.			
2.3.5	Duration of the test / Exposure time	30 hours and 45 m	minutes.		
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	Untreated control same conditions	Is were included, these were kept and stored un as the treated pupae of <i>A. punctatum</i> .	ider the	
2.4	Examination				
2.4.1	Effect investigated	Lethal accumulat determined 3 day	ed dosage (LAD) expressed as g-h/m ³ . The LA s after treatment and finally 28 days after treatment	D was ment.	
2.4.2	Method for recording / scoring of the effect	Pupae mortality b pupae 3 days afte	by examination (count) of beetles hatched from er treatment and finally 28 days after treatment.	treated	
2.4.3	Intervals of examination	3 days after treat	ment and finally 28 days after treatment.		
2.4.4	Statistics	Post fumigation r number of dead p treatment and fin	nean total mortality was calculated by dividing pupae by the total number of treated pupae 3 da ally 28 days after treatment.	, the ys after	
2.4.5	Post fumigation monitoring of the test organism	The total mortalit days after treatmo	ty-effect of sufuryl fluoride on pupae was deter ent and finally 28 days after treatment.	mined 3	
		3 RESUL	TS		
3.1	Efficacy	The percentage n dead pupae by th	nortality was calculated by dividing the total nu e total number of treated pupae.	umber of	Х

Percentage mortality of pupae of Anobium punctatum 3 da	ys
after exposure to sulfuryl fluoride	

A	-	Untreate	d Control	
No.	Pupae	beetles hatched	Living pupae	Dead pupae
K	10	2	8	0

Total mortality of untreated pupae: 0 %

В		Treated	l pupae	
No.	Pupae	beetles hatched	Living pupae	Dead pupae
1	10	0	1	9

Total mortality of treated pupae: 90 %

Percentage mortality of pupae of *Anobium punctatum* 28 days after exposure to sulfuryl fluoride

A		Untreate	d Control	
No.	Pupae	beetles hatched	Living pupae	Dead pupae
K	10	8	0	2

Total mortality of untreated pupae: 20 %

В		Treated	l pupae	
No.	Pupae	beetles hatched	Living pupae	Dead pupae
1	10	0	0	10

Total mortality of treated pupae: 100 %

Section B5.10.2		Efficacy Data			
Annex TNsG:] Pt. III-0	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/40 Anobium punctatum Laboratory study (Ref. Z40)			
3.1.1	Dose/Efficacy curve	Not available from report.			
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 28 days after treatment.			
3.1.3	Observed effects in the post monitoring phase	Jo unusual effect observed.			
3.2	Effects against organisms or objects to be protected	None reported.			
3.3	Other effects	None reported.			
3.4	Efficacy of the reference substance	No reference substance was used.			
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.			
3.6	Efficacy limiting factors				
3.6.1	Occurrences of resistances	None reported.			
3.6.2	Other limiting factors	None reported.			
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS			
4.1	Reasons for	1 Precise conditions could be determined.			
	laboratory testing	2 Practical, accurate procedure.			
		Data generated is considered relevant for field of use. Test insects obtained from the field.			
4.2	Intended actual scale of biocide application	Not applicable.			
4.3	Relevance compared to field conditions				
4.3.1	Application method	The principle of fumigation is to confine a sufficient concentration for a sufficient period of time to enable a toxic dose to be received by the target pest. There are a number of ways in laboratory and field studies to achieve this although the principle is the same.			
4.3.2	Test organism	There are different life stages of <i>Anobium punctatum</i> . Pupae are considered to be a stage which would require a higher dose of sulfuryl			

310(342)

Dow A RMS:	AgroSciences Sweden	April 2004	Vikane	Doc III-B5
Sectio Annex	n B5.10.2 Point IIB5.10	Efficacy Data		
TNsG: Pt. III-	Pt. I-B5.10, Ch. 6	B5.10.2/40 And Laboratory stu	obium punctatum udy (Ref. Z40)	
		fluoride compared	to larvae.	
4.3.3	Observed effect	The complete mor considered as the of <i>Anobium punctatu</i>	tality effect, recorded in the labor desired field response for eradication.	atory test is ion of pupae of
4.4	Relevance for read-across	Not applicable.		
		5 APPLIC	ANT'S SUMMARY AND CON	CLUSION
5.1	Materials and methods	Pupae of <i>Anobium</i> 30 hours and 45 m humidity in labora were tested to dete using a Fumiscope after treatment and	<i>punctatum</i> were fumigated with s inutes at a temperature of 11.5 °C tory fumitoria. Bioassays from la ermine LAD. Fumigant concentra e gas analyser. Mortality rate was d 28 days after treatment.	sulfuryl fluoride for and 58 % relative boratory population tion was measured evaluated 3 days
5.2	Reliability	Reliability indicate accepted scientific methodological de results.	or 2: Study conducted in accordan e principles, possibly with incomp ficiencies, which do not affect the	the with generally lete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this i complete level of Additional trials h the dose rates of th stage at different t	nvestigation was that under the decontrol of <i>Anobium punctatum</i> purave to be performed to understand the fumigant to achieve the LAD for emperatures.	escribed conditions a pae was achieved. I the variability of or this specific life
5.4	Conclusion	There are different wooden structures considered to be a efficacy of sulfury results showed tha this pest species.	t life stages of <i>Anobium punctatum</i> . The laboratory fumigation test uvalid and effective procedure for a fluoride on the pupae of <i>A. punc</i> at sulfuryl fluoride was highly effe	<i>n</i> present in infested undertaken was evaluating the <i>tatum</i> . The efficacy betive on pupae of
5.5	Proposed efficacy specification	Total control of pu	apae of Anobium punctatum.	

	Evaluation by Competent Authorities
	EVALUATION BY RAPPORTEUR MEMBER STATE
Date	October 2004.
Comments	Field 2.3.3. Table 1.3, dosage rate: All pupae were fumigated at $12.5 \text{ g/m}^3 \dots$ leading to an accumulated dosage of 384 g-h/m^3 .
	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).
Summary and conclusion	Applicant's version is adopted.

1.1 Test organism - Anobium puntatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	10 pupae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz-Spaltblock wurde mit 10 parasitenfreien, lebendigen Puppen des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Life stage	Pupae.
Mixed age population	Not applicable.
Number of pupae in test	10.

1.2 Test system

Criteria	Details
Test chamber	Fumitoria (fumigation chambers) made of acrylic glass, 40 x 25 x 14.5 cm = 14.5 litres, gas introduction via polyamide (PA) -lines 6 mm external diameter/4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	10 pupae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz-Spaltblock wurde mit 10 parasitenfreien, lebendigen Puppen des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas-analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the fumitoria in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the fumitorium by using a heat-exchanger- system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the fumatorium using a gas syringe.
Dosage rate	<u>Pupae</u> All pupae were fumigated at 11.9 g/m ³ for a total exposure period of 30 hours and 45 minutes leading to an accumulated dosage of 367 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 11.5 °C.
Moisture	Fumigation was conducted at an average 58 % relative humidity.

Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/41 Anobium punctatum Field study (Ref. Z41)			
		1 REFERENCE: Z41, B5.10.2/41	Official use only		
1.1	Reference	¹ Binker, G., ¹ Binker, J., ¹ Fröba G. and ² Franke P. (1997).			
		¹ Binker Materialschutz GmbH, Westendstr. 3, D-91207 Lauf, Germany			
		² Von der IHK Nürnberg öffentlich bestellte und vereidigte Sachverständige für Vorratsschädlinge und biologische Schäden am Holz, Hohe Linde 2, D-90607 Rückersdorf, Germany.			
		Field study on Anobium punctatum Number: 111.05.1997.			
1.2	Data protection	Yes.			
1.2.1	Data owner	Dow AgroSciences LLC.			
1.2.2	Companies with letter of Access	None.			
1.2.3	Criteria for data protection	Data submitted to the MS after 13 May 2000 on existing b.p. for the purpose of its entry into Annex I			
1.3	Guideline study	The study was undertaken on the basis of sound principles of fumigation practice.			
1.4	Deviations	Not applicable as the study not conducted to an international standard method.			
		2 METHOD			
2.1	Test Substance (Biocidal Product)	Sulfuryl fluoride.			
2.1.1	Trade name/ proposed trade name	Vikane.			
2.1.2	Composition of Product tested	> 99% Sulfuryl fluoride.			
2.1.3	Physical state and nature	Fumigant.			
2.1.4	Monitoring of active substance concentration	Monitoring was undertaken using a Fumiscope gas analyser.			
2.1.5	Method of analysis	Not applicable.			
2.2	Reference substance	No reference substance was included in the study.			
2.2.1	Method of analysis for reference substance	Not applicable.			
2.3	Testing procedure				

Dow RMS	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5	
Section B5.10.2		Efficacy Data			
Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		B5.10.2/41 Anobium punctatum Field study (Ref. Z41)			
2.3.1	Test population / inoculum / test organism	See Table 1.1.			
2.3.2	Test system	See Table 1.2.			
2.3.3	Application of TS	See Table 1.3.			
2.3.4	Test conditions	See Table 1.4.			
2.3.5	Duration of the test / Exposure time	70 hours.			
2.3.6	Number of replicates performed	One.			
2.3.7	Controls	No controls were incl	luded in this study.		
2.4	Examination				
2.4.1	Effect investigated	Lethal accumulated d determined 6 days after	losage (LAD) expressed as g-h/m ³ . LAN ter treatment.	D was	
2.4.2	Method for recording / scoring of the effect	Pupae-mortality by e treatment.	xamination (count) of dead pupae 6 day	ys after	
2.4.3	Intervals of examination	6 days after treatmen	t.		
2.4.4	Statistics	Post fumigation mean number of dead pupa treatment.	n total mortality was calculated by divide by the total number of treated pupae of	ding the 6 days after	
2.4.5	Post fumigation monitoring of the test organism	See 2.4.4.			
		3 RESULTS			
3.1	Efficacy	The percentage morta dead pupae by the tot	ality was calculated by dividing the tota al number of treated pupae.	al number of X	

Percentage mortality of pupae of *Anobium punctatum* after exposure to sulfuryl fluoride.

	Treated pupae		
No.	Pupae	Dead Pupae	
1	12	12	
TT 1 1	0 1	100.0/	

Total mortality of treated pupae: 100 %.

Dow AgroSciences RMS: Sweden		April 2004 Vikane	Doc III-B5
Section B5.10.2		Efficacy Data	
Annex TNsG: Pt. III-	Point IIB5.10 Pt. I-B5.10, Ch. 6	B5.10.2/41 Anobium punctatum Field study (Ref. Z41)	
3.1.1	Dose/Efficacy curve	Not available from report.	
3.1.2	Begin and duration of effects	A mortality of 100 % was achieved 6 days after treatment.	
3.1.3	Observed effects in the post monitoring phase	No unusual effect observed.	
3.2	Effects against organisms or objects to be protected	None reported.	
3.3	Other effects	None reported	
3.4	Efficacy of the reference substance	No reference substance was used.	
3.5	Tabular and/or graphical presentation of the summarised results	See 3.1.	
3.6	Efficacy limiting factors		
3.6.1	Occurrences of resistances	None reported.	
3.6.2	Other limiting factors	None reported.	
		4 RELEVANCE OF THE RESULTS COMPARED TO FIELD CONDITIONS	
4.1	Reasons for laboratory testing	Not applicable.	
4.2	Intended actual scale of biocide application	Not applicable.	
4.3	Relevance compared to field conditions	Not applicable.	
4.3.1	Application method	Not applicable.	
4.3.2	Test organism	Not applicable.	
4.3.3	Observed effect	Not applicable.	
4.4	Relevance for read-across	Not applicable.	

Dow A RMS:	AgroSciences : Sweden	April 2004	Vikane	Doc III-B5
Section B5.10.2 Annex Point IIB5.10 TNsG: Pt. I-B5.10, Pt. III-Ch. 6		Efficacy Data B5.10.2/41 Anobium punctatum Field study (Ref. Z41)		
5.1	Materials and methods	5 APPLIC Pupae of <i>Anobiun</i> 70 hours at a temp condition (church	CANT'S SUMMARY AND CON <i>in punctatum</i> were fumigated with sperature of 12.0°C in a practical fun- of a volume of 525 m ³). Bioassay	CLUSION sulfuryl fluoride for migation under field vs from laboratory
5.2	Reliability	population were to measured using a 6 days after treatm Reliability indicat accepted scientific methodological do results.	Fumiscope gas analyser. Mortalit nent. tor 2: Study conducted in accordan c principles, possibly with incompl efficiencies, which do not affect the	y rate was evaluated ce with generally lete reporting or e quality of relevant
5.3	Assessment of efficacy, data analysis and interpretation	The result of this complete control of Additional trials he the dose rates of t stage at different	investigation was that under the de of <i>Anobium punctatum</i> pupae was have to be performed to understand the fumigant to achieve the LAD for temperatures.	escribed conditions achieved. I the variability of or this specific life
5.4	Conclusion	There are differen wooden structures to be a valid and e sulfuryl fluoride c showed that sulfu species.	nt life stages of <i>Anobium punctatum</i> s. The field fumigation test undert effective procedure for evaluating to on the pupae of <i>A. punctatum</i> . The ryl fluoride was highly effective of	<i>n</i> present in infested aken was considered the efficacy of efficacy results n pupae of this pest
5.5	Proposed efficacy specification	Total control of p	upae of Anobium punctatum.	

	Evaluation by Competent Authorities	
	EVALUATION BY RAPPORTEUR MEMBER STATE	
Date	October 2004.	
Comments	Field 3.1: Within the body of each table the numbers are counts and not percentages (as stated in the table legend above the tables).	
Summary and conclusion	Applicant's version is adopted.	

1.1 Test organism - Anobium punctatum

Criteria	Details
Family	Anobiidae.
Species	Anobium punctatum.
Source	Laboratory population.
Life stage	Pupae.
Mixed age population	Not applicable.
Number of pupae in test	12.

1.2 Test system

Criteria	Details
Test chamber	Fumigation was carried out under field conditions in a typical Bavarian church in Germany (volume: 525 m ³). Gas introduction via polyamide (PA) lines 6 mm external diameter 4 mm internal diameter, gas monitoring via separate PA-lines 6 mm external diameter/4 mm internal diameter.
Test insects introduction into chamber	12 pupae in one block of pine-wood (<i>Picea abies</i>) according to LGA ("Ein Fichtenholz-Spaltblock wurde mit 12 parasitenfreien, lebendigen Puppen des Gewöhnlichen Nagekäfers (<i>Anobium punctatum</i>) in den vorgebohrten Probetrögen versehen. Nach Zusammenfügen der Spaltblockhälften verklebte man die Trennfugen mit Klebeband.").
Measuring equipment	Gas concentrations were verified upon initiation, periodically during fumigation and upon termination using a Fumiscope gas analyser.

1.3 Application of test substance

Criteria	Details
Application procedure	Sulfuryl fluoride was supplied in commercial steel cylinders as a liquid under pressure. It was introduced into the structure in its gaseous form.
Delivery method	Sulfuryl fluoride was made available for introduction into the structure by using a heat-exchanger-system. Exact amounts of sulfuryl fluoride were transferred from the cylinder to the structure using a digital scale. Gas was mixed as it was injected using a fan inside the structure.
Dosage rate	<u>Pupae</u> All pupae were fumigated at a mean concentration of 10.8 g/m^3 for a total exposure period of 70 hours leading to an accumulated dosage of 757 g-h/m ³ .

1.4 Test conditions

Criteria	Details
Incubation temperature	Fumigation was conducted at an average temperature of 12.0 °C.
Moisture	Not available from report.

Dow AgroSciences	April 2004	Vikane	Doc III-B5
RMS: Sweden			

Data protection is claimed by Dow AgroSciences in accordance with Article 12.1(c) (i) and (ii) of Council Directive 98/8/EC for all study reports marked "Y" in the "Data Protection Claimed Y/N" column of the lists below (numbered 1-2). For studies marked Y(i) data protection is claimed under Article 12.1(c) (i), for studies marked Y(ii) data protection is claimed under Article 12.1(c) (ii). These claims are based on information from the applicant. It is assumed that the relevant studies are not already protected in any other MS of the European Union under existing national rules relating to biocidal products. It is not possible for the rapporteur to confirm the accuracy of this information. Sweden has earlier received those studies marked with Y(i) to support national product authorisation and according the Biocidal Products Ordinance (SFS 2000:338) section 14, those studies may be used for the benefit of other applicants only after 13 May 2010, while studies marked with Y(i) may be used for the benefit of another applicant only after the expiry of a period of ten years from the date the active substance was first listed in Annex I or IA to the Biocides Directive 98/8/EC.

Data Owner:	D = Dow AgroSciences
	P= Public domain

1. List of Studies Sorted by <u>Section Number and Reference Number</u>

					G	GLP/GEP Study Y/N							
						Ρu	ıbli	shed	Y/.	N			
						Vertebrate Study Y/N				e Study Y/N			
								Dat	a P	rotection Clai	imed Y/N		
									D	ata Owner			
98/8 Section Number (IIIB)	91/414 Annex Section	Author	Title	Laboratory						Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/01	n/a 98/8 specific	Osbrink, W.L.A., Scheffrahn, R.H., Su, N-Y., and Rust, M.K.	Laboratory comparisons of sulfuryl fluoride toxicity and mean time of mortality among ten termite species (Isoptera: Hodotermitidae, Kalotermitidae, Rhinotermitidae).	Publication: Journal of Economic Entomology Volume 80, pages 1044 – 1047.	N	Y	N	N	P	01	1987	None	Z1

RMS: Sv	veden												
					G	GLP/GEP Study Y/N						7	
						Ρι	ıbli	shed	Y/	N			
							V	ertel	orate	e Study Y/N			
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98/8 Section Number (IIIB)	91/414 Annex Section	Author	Title	Laboratory						Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/02	n/a 98/8 specific	Su, N-Y., Osbrink, W.L.A., and Scheffrahn, R.H.	Concentration-time relationship for fumigant efficacy of sulfuryl fluoride against the Formosan subterranean termite (Isoptera: Rhinotermitidae).	Publication: Journal of Economic Entomology Volume 82, pages 156 – 158.	N	Y	N	N	Р	02	1989	None	Z2
5.10.2/03	n/a 98/8 specific	Su, N-Y., and Scheffrahn, R.H.	Field comparison of sulfuryl fluoride susceptibility among three termite species (Isoptera: Kalotermitidae, Rhinotermitidae) during structural fumigation.	Publication: Journal of Economic Entomology Volume 79, pages 903 – 908.	N	Y	N	N	Р	03	1986	None	Z3
5.10.2/04	n/a 98/8 specific	La Fage, J.P., Jones, M., and Lawrence, T	A laboratory evaluation of the fumigant, sulfuryl fluoride (Vikane), against the Formosan termite <i>Coptotermes</i> <i>formosanus</i> Shiraki.	Publication: The International Research Group on Wood Preservation, Thirteenth Annual Meeting, May 1982. IRG Secretariat Drottning Kristinas väg 47C, S – 11428 Stockholm, Sweden	N	Y	N	N	Р	04	1982	None	Z4

Doc III-B5

Dow AgroSciences

April 2004

Dow AgroSciences RMS: Sweden			April 2004	Vikane										Doc III-B5				
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								V	Ver	teb	rate	e Study Y/N	_					
										Data	a Pi	rotection Cla	imed Y/N	_				
98/8 Section Number (IIIB)	91/414 Annex Section	Author	Title		Laboratory							Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref			
5.10.2/05	n/a 98/8 specific	Soma, Y., Naito, H., Misumi, T., Mizobuchi, m., Tsuchiya, Y., Matsuoka, I., Kawakami, F., Hirata, K., and Komatsu., H.	Effects of some fumi nematode, <i>Buraphele</i> infecting wooden pao Susceptibility of pine methyl bromide, sulf methyl isothiocyanat	gants on pine wood enchus xylophilus, ekages. e wood nematode to uryl fluoride and e.	Publication: Research Bulletin Plant Protection, Japan, 2001, Number 37, pages 19 – 26.	N	Y	/ N	I I	N	Р	05	2001	None	Z5			
5.10.2/06	n/a 98/8 specific	Dwinell, L.D., Thoms, E., and Prabhakaran, S.	Exploratory research fumigation to eradic nematode in unseasc	n on sulfuryl fluoride ate the pine wood oned pine lumber.	Annual International Research Conference on Methyl Bromide Alternatives and Emission Reduction, 2003, San Diego, California, USA.	. N	Y	/ N	I N	N	Р	06	2003	None	Z6			
5.10.2/07	n/a 98/8 specific	Verheyen, H.	Investigatory studies effect of a fumigant pests.	s on the ovicidal on dry wood insect	Fachhochschule, Eberswalde, Germany. Student Research Project	Y	N	N N	N <u>)</u> (Y ii)	D	07	2002	None	Z7			

Dow Agr RMS: Sw	oSciences veden	1	April 2004	Vikane									Doc III-F	35
						G	LP	/Gl	EP S	tudy	/ Y/N			
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								Data Protection Claimed Y/N				_		
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98/8 Section Number (IIIB)	91/414 Annex Section	Author	Title		Laboratory						Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/08	n/a 98/8 specific	Ducom, P., Roussel, C., and Stefanini, V.	Efficacy of sulfuryl European house bor bajulus (L.) (Coleop Cerambycidae).	fluoride on er eggs, Hylotrupes itera;	Laboratoire National de la Protection des Végétaux, Station d'Etude des Tech- niques de fumigation et de Protection des Denrées Stockées, Chemin d'Artigues - 33150 Cenon, France.	I Y	N	N	Y (ii)	D	08	2003	None	Z8
5.10.2/09	n/a 98/8 specific	Su, N-y., and Scheffrahn, R.H.	Efficacy of sulfuryl beetle pests of muse Dermestidae, Anobi	fluoride against four rums (Coleoptera: idae).	Publication: Journal of Economic Entomology Volume 83, pages 879 – 882.	N	Y	N	N	Р	09	1990	None	Z9
5.10.2/10	n/a 98/8 specific	Williams, L.H., and Sprenkel, R.J.	Ovicidal activity of Anobiid and Lyctid various ages.	sulfuryl fluoride to beetle eggs of	Publication: Journal of Entomological Science, Volume 25(3), pages 366 – 375.	N	Y	N	N	Р	10	1990	None	Z10

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					G	LF	P/G]	EP S	tudy	y Y/N			
						P	ubli	shed	Y/]	N			
							V	ertet	orate	e Study Y/N			
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98/8 Section Number (IIIB)	91/414 Annex Section	Author	Title	Laboratory						Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/11	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatum</i> Number: 121641. Unpublished.	Binker Materialschutz, Germany	Y	N	[N	Y (ii)	D	11	1995	None	Z11
5.10.2/12	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Field study on <i>Anobium punctatum</i> Number: 123418/B and 123418/D. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	12	1996	None	Z12
5.10.2/13	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Field study on <i>Anobium punctatum</i> Number: 123418/C and 123418/D. Unpublished.	Binker Materialschutz, Germany	Y	N	[N	Y (ii)	D	13	1996	None	Z13
5.10.2/14	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatum</i> Number: 125749/C and 125749/E (Bioassay 151 – 160). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	14	1997	None	Z14
5.10.2/15	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and	Laboratory study on <i>Anobium punctatum</i> Number: 125749/C and 125749/E (Bioassay 161 - 180).	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	15	1997	None	Z15

Doc III-B5

Dow AgroSciences

April 2004

Lanz, B.

Unpublished.

Dow AgroSciences RMS: Sweden			April 2004 Vikane									Doc III-I	B5
98/8 91/414 Author			Title	Laboratory		FLI P	P/G ubl	EP lishe Verte D	Stu ed Y ebra ata	dy Y/N 7/N hte Study Y/N Protection Cla Data Owner Report No.	imed Y/N Report	Dow	Ref.
Section Number (IIIB)	Annex Section									/ Study ID	Date	AgroSciences Report No	3
5.10.2/16	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatus</i> Number: 125749/C and 125749/E (Bioassay 181 – 200). Unpublished.	<i>m</i> Binker Materialschutz, Germany	Y	Ň	I N	V Y (ii)	D 16	1997	None	Z16
5.10.2/17	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Field study on <i>Anobium punctatum</i> Number: 402741/A and 402741/B (Bioassay 1 – 60). Unpublished.	Binker Materialschutz, Germany	Y	Ň	I N	V Y (ii)	D 17	2000	None	Z17
5.10.2/18	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Field study on <i>Anobium punctatum</i> Number: 402741/A and 402741/B (Bioassay 61 - 120). Unpublished.	Binker Materialschutz, Germany	Y	Ň	I N	NY (ii)	D 18	2000	None	Z18
5.10.2/19	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatu</i> . Number: 402741/C and 402741/D (Bioassay 143 - 165). Unpublished.	m Binker Materialschutz, Germany	Y	N	I N	V Y (ii)	D 19	2000	None	Z19

Unpublished.
Dow Agr RMS: Sv	oSciences veden		April 2004 Vikane									Doc III-I	35
98/8 Section Number (IIIB)	91/414 Annex Section	Author	Title	Laboratory		iLP	P/G ubl	EP S lishe /erte Da	Stud d Y/ brat nta I	y Y/N N e Study Y/N Protection Cla Data Owner Report No. / Study ID	imed Y/N Report Date	Dow AgroSciences Report No	Ref.
5.10.2/20	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatu</i> . Number: 402741/C and 402741/D (Bioassay 166 - 188). Unpublished.	<i>m</i> Binker Materialschutz, Germany	Y	N	[]N	V Y (ii)		20	2000	None	Z20
5.10.2/21	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatu</i> . Number: 130377/A and 403972 (Bioassay 11 – 15). Unpublished.	m Binker Materialschutz, Germany	Y	N	N	V Y (ii)	E	21	1999	None	Z21
5.10.2/22	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatu</i> . Number: 130377/A and 403972 (Bioassay 16 - 20). Unpublished.	m Binker Materialschutz, Germany	Y	N	N	V Y (ii)		0 22	1999	None	Z22
5.10.2/23	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatu</i> . Number: 130377/A and 403972 (Bioassay 21 - 25). Unpublished.	m Binker Materialschutz, Germany	Y	N	N	V Y (ii)	E	23	1999	None	Z23

Unpublished.

Dow Agr RMS: Sv	oSciences veden		April 2004 Vikane									Doc III-I	B5
98/8 Section Number (IIIB)	91/414 Annex Section	Author	Title	Laboratory		P	P/G ubl	EP S lishe /erte Da	Stud d Y/ brat ata I I	y Y/N /N Protection Cla Data Owner Report No. / Study ID	imed Y/N Report Date	Dow AgroSciences Report No	Ref.
5.10.2/24	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatu</i> Number: 130377/A and 403972 (Bioassay 26 - 30). Unpublished.	<i>m</i> Binker Materialschutz, Germany	Y	N	N	V Y (ii)) 	24	1999	None	Z24
5.10.2/25	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatu</i> Number: 130377/A and 403972 (Bioassay 31 - 35). Unpublished.	<i>m</i> Binker Materialschutz, Germany	Y	N	N	V Y (ii)))	25	1999	None	Z25
5.10.2/26	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatu</i> Number: 130377/A and 403972 (Bioassay 36 - 40). Unpublished.	<i>m</i> Binker Materialschutz, Germany	Y	N	N	V Y (ii)))	26	1999	None	Z26
5.10.2/27	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatu</i> Number: 130377/A and 403972 (Bioassay 41 - 45). Unpublished.	<i>m</i> Binker Materialschutz, Germany	Y	N	N	V Y (ii))	27	1999	None	Z27

Unpublished.

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98/8 Section Number (IIIB)	91/414 Annex Section	Author	Title	Laboratory						Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/28	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatum</i> Number: 130377/A and 403972 (Bioassay 46 - 50). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	28	1999	None	Z28
5.10.2/29	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatum</i> Number: 130377/A and 403972 (Bioassay 51 - 55). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)		29	1999	None	Z29
5.10.2/30	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium punctatum</i> Number: 130377/A and 403972 (Bioassay 56 - 60). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	0 30	1999	None	Z30
5.10.2/31	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: LBM 541 1320/113. Unpublished.	Binker Materialschutz, Germany	Y	N	N	(ii)	D	31	2001	None	Z31
5.10.2/32	n/a 98/8	Binker, G., Binker, J., Fröba,	Field study on <i>Anobium punctatum</i> Number: LBM 541 1320/116.	Binker Materialschutz,	Y	N	N	Y (ii)	D D	32	2001	None	Z32

Doc III-B5

April 2004

G., Franke, P. and Ultsch, R.

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r		1	1					i		D	ata Owner	-1		1
98/8 Section Number (IIIB)	91/414 Annex Section	Author	Title	Laboratory							Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/33	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: MBP 548 1317/20. Unpublished.	Binker Materialschutz, Germany	Y	ľ	N	N	Y (ii)	D	33	2001	None	Z33
5.10.2/34	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: MBP 548 1317/32. Unpublished.	Binker Materialschutz, Germany	Y	ľ	N	N	Y (ii)	D	34	2001	None	Z34
5.10.2/35	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: LBM 540 1336/30. Unpublished.	Binker Materialschutz, Germany	Y	1	N	N	Y (ii)	D	35	2000	None	Z35
5.10.2/36	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: LBM 540 1336/37. Unpublished.	Binker Materialschutz, Germany	Y	1	N	N	Y (ii)	D	36	2000	None	Z36
5.10.2/37	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Laboratory study on <i>Anobium punctati</i> Number: 121.08.1998 No.1. Unpublished.	m Binker Materialschutz, Germany	Y	ľ	N	N	Y (ii)	D	37	1998	None	Z37

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08/8	91/414	Author	Title	Laboratory	G	P	P/G ubl	EP ishe /erte D	Stud d Y/ brat ata F	y Y/N N e Study Y/N Protection Cla Data Owner Report No	imed Y/N	Dow	Rof
Section Number (IIIB)	Annex Section	Autio		Laboratory						/ Study ID	Date	AgroSciences Report No	, Ne 1.
5.10.2/38	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Laboratory study on <i>Anobium punctatun</i> Number: 121.08.1998 No.2. Unpublished.	n Binker Materialschutz, Germany	Y	N	N	Y (ii))	38	1998	None	Z38
5.10.2/39	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Laboratory study on <i>Anobium punctatun</i> Number: 121.08.1998 No.3. Unpublished.	n Binker Materialschutz, Germany	Y	N	N	Y (ii))	39	1998	None	Z39
5.10.2/40	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Laboratory study on <i>Anobium punctatun</i> Number: 121.08.1998 No.4. Unpublished.	n Binker Materialschutz, Germany	Y	N	N	(ii))	40	1998	None	Z40
5.10.2/41	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Field study on <i>Anobium punctatum</i> Number: 111.05.1997. Unpublished.	Binker Materialschutz, Germany	Y	N	N	(ii))	41	1997	None	Z41
5.11	n/a	Prabhakaran, S.K. and Ray, S.	ProFume Resistance Risk Analysis (Sequential Quantitative Resistance	Dow AgroSciences, Mooresville, USA	N	N	N	Y (ii) D	None	Decemb er 2002	None	Z42

(Sequential Quantitative Resistance

Model)

Dow AgroSciences	April 2004	Vikane	Doc III-B5
RMS: Sweden			

2. List of Studies Sorted by <u>Author</u>

					GL	P/G Pub	EP lish	Stuc ed Y	dy {/l	Y/N N			
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98/8 Section Number III-B	91/414 Annex Section	Author	Title	Laboratory		1				Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/37	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 121.08.1998 No.1. Unpublished.	Binker Materialschutz, Germany	YI	N N	V Y (i	i)	D	37	1998	None	Z37
5.10.2/38	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 121.08.1998 No.2. Unpublished.	Binker Materialschutz, Germany	Y	NN	V Y (i	i)	D	38	1998	None	Z38
5.10.2/39	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 121.08.1998 No.3. Unpublished.	Binker Materialschutz, Germany	YI	NN	J Y (i	i)	D	39	1998	None	Z39
5.10.2/40	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 121.08.1998 No.4. Unpublished.	Binker Materialschutz, Germany	YI	N N	V Y (i	i)	D	40	1998	None	Z40

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98/8	91/414	Author	Title	Laboratory	GI	LP/ Pu	GE ıbli	EP Stishec ertet Da	tudy l Y/ orate ta P D	/ Y/N /N e Study Y/N /rotection Clair ata Owner Report No. /	ned Y/N Report Date	Dow	Ref.
Section Number III-B	Annex Section									Study ID		AgroSciences Report No	
5.10.2/41	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G. and Franke, P.	Field study on <i>Anobium punctatum</i> Number: 111.05.1997. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	41	1997	None	Z41
5.10.2/31	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: LBM 541 1320/113. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	31	2001	None	Z31
5.10.2/32	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: LBM 541 1320/116. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	32	2001	None	Z32
5.10.2/33	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: MBP 548 1317/20. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	33	2001	None	Z33

Doc III-B5

Dow AgroSciences

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98/8 Section Number III-B	91/414 Annex Section	Author	litte	Laboratory						Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/34	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: MBP 548 1317/32. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	34	2001	None	Z34
5.10.2/35	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: LBM 540 1336/30. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	35	2000	None	Z35
5.10.2/36	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Franke, P. and Ultsch, R.	Field study on <i>Anobium punctatum</i> Number: LBM 540 1336/37. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	36	2000	None	Z36
5.10.2/11	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 121641. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	11	1995	None	Z11

Doc III-B5

Vikane

Dow Ag RMS: S	roScience weden	S	April 2004	/ikane								Doc III	-B5
					GI	LP/	GE bli Ve	EP St shed erteb Dat	udy I Y/ orate ta P	y Y/N /N e Study Y/N Protection Clair ata Owner	ned Y/N		
98/8 Section Number III-B	91/414 Annex Section	Author	Title	Laboratory						Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/12	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Field study on <i>Anobium punctatum</i> Number: 123418/B and 123418/D. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	12	1996	None	Z12
5.10.2/13	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Field study on <i>Anobium punctatum</i> Number: 123418/C and 123418/D. Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	13	1996	None	Z13
5.10.2/14	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 125749/C and 125749/E (Bioassay 151 – 160). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	14	1997	None	Z14
5.10.2/15	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 125749/C and 125749/E (Bioassay 161 - 180). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	15	1997	None	Z15

Dow Ag RMS: S	roScience weden	S	April 2004 Vi	kane								Doc III	-B5
					G	LP/ Pi	GE Jbli	P St shed erteb	udy Y/	Y/N N Study Y/N			
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98/8 Section Number III-B	91/414 Annex Section	Author	Title	Laboratory				1	Da	Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/16	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 125749/C and 125749/E (Bioassay 181 – 200). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	16	1997	None	Z16
5.10.2/17	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Field study on <i>Anobium punctatum</i> Number: 402741/A and 402741/B (Bioassay 1 – 60). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	17	2000	None	Z17
5.10.2/18	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Field study on <i>Anobium punctatum</i> Number: 402741/A and 402741/B (Bioassay 61 - 120). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	18	2000	None	Z18
5.10.2/19	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 402741/C and 402741/D (Bioassay 143 - 165). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	19	2000	None	Z19

Dow Ag RMS: S	roScience weden	8	April 2004 Vi	kane								Doc III	-B5
					G	LP/ Pu	/GE abli Ve	P St shed erteb Dat	udy Y/ orate	/ Y/N N e Study Y/N rotection Clair	ned Y/N		
98/8 Section Number III-B	91/414 Annex Section	Author	Title	Laboratory					D	ata Owner Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/20	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 402741/C and 402741/D (Bioassay 166 - 188). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	20	2000	None	Z20
5.10.2/21	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> punctatum Number: 130377/A and 403972 (Bioassay 11 – 15). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	21	1999	None	Z21
5.10.2/22	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 130377/A and 403972 (Bioassay 16 - 20). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	22	1999	None	Z22
5.10.2/23	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz B	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 130377/A and 403972 (Bioassay 21 - 25). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	23	1999	None	Z23

Dow Ag RMS: S	roScience weden	S	April 2004 Vil	kane								Doc III	-B5
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98/8 Section Number III-B	91/414 Annex Section	Author	Title	Laboratory						Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/24	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 130377/A and 403972 (Bioassay 26 - 30). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	24	1999	None	Z24
5.10.2/25	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 130377/A and 403972 (Bioassay 31 - 35). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	25	1999	None	Z25
5.10.2/26	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 130377/A and 403972 (Bioassay 36 - 40). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	26	1999	None	Z26
5.10.2/27	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz B	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 130377/A and 403972 (Bioassay 41 - 45). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	27	1999	None	Z27

Doc III-B5

Dow Ag RMS: S	roScience weden	S	April 2004 Vi	kane	Doc III-B5						[- B 5		
98/8 Section Number	91/414 Annex Section	Author	Title	Laboratory	GL	<u>P/</u> Pu	GE abli	EP St shec erteb Dat	udy I Y/ orate Ta P	/ Y/N N e Study Y/N rotection Clair ata Owner Report No. / Study ID	ned Y/N Report Date	Dow AgroSciences Report No	Ref.
5.10.2/28	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 130377/A and 403972 (Bioassay 46 - 50). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	28	1999	None	Z28
5.10.2/29	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 130377/A and 403972 (Bioassay 51 - 55). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	29	1999	None	Z29
5.10.2/30	n/a 98/8 specific	Binker, G., Binker, J., Fröba, G., Graf, E., and Lanz, B.	Laboratory study on <i>Anobium</i> <i>punctatum</i> Number: 130377/A and 403972 (Bioassay 56 - 60). Unpublished.	Binker Materialschutz, Germany	Y	N	N	Y (ii)	D	30	1999	None	Z30

Dow Ag RMS: S	roScience weden	s	April 2004	Vikane								Doc III	-B5
					GL	P/C	GEP	Stu	dy	Y/N			
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98/8 Section Number III-B	91/414 Annex Section	Author	Title	Laboratory						Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/08	n/a 98/8 specific	Ducom, P., Roussel, C., and Stefanini, V.	Efficacy of sulfuryl fluoride on European house borer eggs, Hylotrupes bajulus (L.) (Coleopter Cerambycidae).	Laboratoire National de la a; Protection des Végétaux, Station d'Etude des Techniques de fumigation et de Protection des Denrées Stockées, Chemin d'Artigues -33150 Cenon, Erance	YI		N Y	(ii)	D	08	2003	None	Z8

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					GI	GLP/GEP Study Y/N Published Y/N Vertebrate Study Y/N							
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98/8 Section Number III-B	91/414 Annex Section	Author	Title	Laboratory						Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/06	n/a 98/8 specific	Dwinell, L.D., Thoms, E., and Prabhakaran, S.	Exploratory research on sulfuryl fluoride fumigation to eradicate the pine wood nematode in unseasoned pine lumber.	Annual International Research Conference on Methyl Bromide Alternatives and Emission Reduction, 2003, San Diego, California, USA.	N	Y	N	N	P	06	2003	None	Z6
5.10.2/04	n/a 98/8 specific	La Fage, J.P., Jones, M., and Lawrence, T	A laboratory evaluation of the fumigant, sulfuryl fluoride (Vikane), against the Formosan termite <i>Coptotermes formosanus</i> Shiraki.	Publication: The International Research Group on Wood Preservation, Thirteenth Annual Meeting, May 1982. IRG Secretariat Drottning Kristinas väg 47C, S – 11428 Stockholm, Sweden.	Ν	Y	N	N	P	04	1982	None	Z4

Doc III-B5

Dow AgroSciences

Dow AgroSciences RMS: Sweden		S	April 2004 Vika	ane								Doc III	-B5
98/8 91/414 Author		Author	Title	Laboratory	GL	.P/C Pu	GE bli: Ve	P Sti shed erteb Dat	udy Y/ rate a P D	/ Y/N N e Study Y/N rotection Clair ata Owner Report No. /	ned Y/N Report Date	Dow	Ref.
Section Number III-B	Annex Section									Study ID		AgroSciences Report No	
5.10.2/01	n/a 98/8 specific	Osbrink, W.L.A., Scheffrahn, R.H., Su, N- Y., and Rust, M.K.	Laboratory comparisons of sulfuryl fluoride toxicity and mean time of mortality among ten termite species (Isoptera: Hodotermitidae, Kalotermitidae, Rhinotermitidae).	Publication: Journal of Economic Entomology Volume 80, pages 1044 – 1047.	N	Y	N	N	Р	01	1987	None	Z1
5.11	n/a	Prabhakaran, S.K. and Ray, S.	ProFume Resistance Risk Analysis (Sequential Quantitative Resistance Model)	Dow AgroSciences, Mooresville, USA	N	N	N	Y (ii)	D	None	December 2002	None	Z42
5.10.2/05	n/a 98/8 specific	Soma, Y., Naito, H., Misumi, T., Mizobuchi, m., Tsuchiya, Y., Matsuoka, I., Kawakami, F., Hirata, K., and Komatsu., H.	Effects of some fumigants on pine wood nematode, <i>Buraphelenchus</i> <i>xylophilus</i> , infecting wooden packages. Susceptibility of pine wood nematode to methyl bromide, sulfuryl fluoride and methyl isothiocyanate.	Publication: Research Bulletin Plant Protection, Japan, 2001, Number 37, pages 19 – 26.	N	Y	N	N	P	05	2001	None	Z5

Dow Ag RMS: Sy	roScience weden	S	April 2004 Vika	ne								Doc III	-B5
					G	LP/ Pı	GE abli	EP St ished erteb Dat	tudy I Y/ prate	y Y/N N e Study Y/N rotection Clair	ned Y/N		
98/8 Section Number III-B	91/414 Annex Section	Author	Title	Laboratory					D	ata Owner Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/02	n/a 98/8 specific	Su, N-Y., Osbrink, W.L.A., and Scheffrahn, R.H.	Concentration-time relationship for fumigant efficacy of sulfuryl fluoride against the Formosan subterranean termite (Isoptera: Rhinotermitidae).	Publication: Journal of Economic Entomology Volume 82, pages 156 – 158.	N	Y	N	N	Р	02	1989	None	Z2
5.10.2/03	n/a 98/8 specific	Su, N-Y., and Scheffrahn, R.H.	Field comparison of sulfuryl fluoride susceptibility among three termite species (Isoptera: Kalotermitidae, Rhinotermitidae) during structural fumigation.	Publication: Journal of Economic Entomology Volume 79, pages 903 – 908.	N	Y	N	N	Р	03	1986	None	Z3
5.10.2/09	n/a 98/8 specific	Su, N-y., and Scheffrahn, R.H.	Efficacy of sulfuryl fluoride against four beetle pests of museums (Coleoptera: Dermestidae, Anobiidae).	Publication: Journal of Economic Entomology Volume 83, pages 879 – 882.	N	Y	N	N	Р	09	1990	None	Z9
5.10.2/07	n/a 98/8 specific	Verheyen, H.	Investigatory studies on the ovicidal effect of a fumigant on dry wood insect pests.	Fachhochschule, Eberswalde, Germany. Student Research Project	Y	N	N	Y (ii)	D	07	2002	None	Z7

Dow AgroSciences RMS: Sweden		5	April 2004 Vika	ine							Doc III	-B5
							GEP S olishe Verte Da	tudy d Y/ brat ta P D	y Y/N /N e Study Y/N Protection Clain pata Owner	ned Y/N		
98/8 Section Number III-B	91/414 Annex Section	Author	Title	Laboratory					Report No. / Study ID	Report Date	Dow AgroSciences Report No	Ref.
5.10.2/10	n/a 98/8 specific	Williams, L.H., and Sprenkel, R.J.	Ovicidal activity of sulfuryl fluoride to Anobiid and Lyctid beetle eggs of various ages.	Publication: Journal of Entomological Science, Volume 25(3), pages 366 – 375	N	Y	N N	Р	10	1990	None	Z10