

## CHEMICAL IDENTIFICATION

### Nomenclature:

**Chemical name (IUPAC)** 2,3,5,6-tetrafluorobenzyl (1R)-trans-3-(2,2-dichlorovinyl)-2,2-dimethyl cyclopropanecarboxylate

**Trade name** Bayothrin®

**Others** NAK 4455

### Chemical Family:

Synthetic Pyrethroids

### CAS number:

118712-89-3

### ELINCS number:

405-060-5

### Molecular formula:

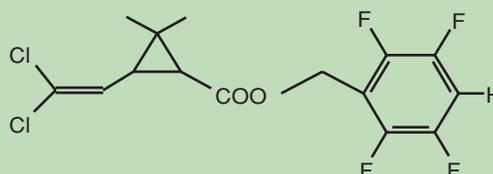
$C_{15}H_{12}Cl_2F_4O_2$

### Molecular weight:

371

### Structural formula:

(unspecified stereochemistry)



## PHYSICAL CHEMISTRY

### Purity:

92% min.

### Appearance:

Colourless to brown liquid or crystal pulp or solid

### Melting range:

30-35 °C

### Density:

1.51 g/cm<sup>3</sup> (23 °C)

### Vapor Pressure:

$4.0 \cdot 10^{-1}$  mPa (20 °C)

### Solubility at 20 °C:

Water  $5.7 \cdot 10^{-5}$  g/l  
Mineral oils and organic solvents (hexane, isopropanol, toluene, dichloromethane) > 200 g/l

## PROPERTIES

- **Broad action spectrum against household and hygiene pests**
- **Very fast Knock-down effect**
- **Good killing activity**
- **Strong Flushing-out effect**
- **High repellence**
- **Very low dosages required**
- **High evaporation rate**
- **Easily formulated both in solvent and water based systems**
- **Relatively low residuality**
- **Easy biodegradability**

Unlike most of other synthetic pyrethroids, Transfluthrin is **extraordinarily effective at very low application rates**. Moreover its **evaporation rate proves to be particularly high**, allowing the substance to evaporate even at room temperature, thus making it suitable to be applied both through heated and unheated systems. Owing to all of these features, Transfluthrin is actually **the active of choice** for **innovative aerosols, vaporizers** (COILS, MATs, LEDs, unheated systems) **and clothes-moth control products**.

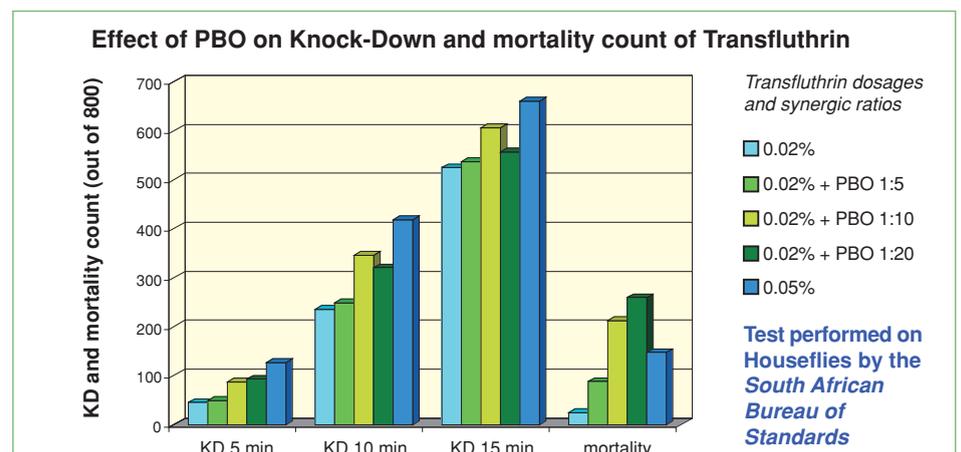
## APPLICATIONS

**AEROSOLS** The recommended dosages for Transfluthrin are 0.02-0.04% for Flying Insect Killers (FIK) and 0.02-0.08% for Crawling Insect Killers (CIK). Transfluthrin provides FIK products with excellent knockdown and killing effects, especially against mosquitoes. Furthermore, thanks to its high evaporation rate, a residual quantity of the active remains vaporised in the air even after the deposition of the sprayed mist: this provides a lasting repellent effect that prevents insects from returning to the room, also giving customers a good psychological effect. Transfluthrin is effective also in CIK

products, due to its fast knockdown and strong flushing-out effect which compels insects to move out quickly from hiding places, thus facilitating their contamination.

The overall performances of formulations containing Transfluthrin can be strongly enhanced by the addition of other killing active ingredients or by the combination with the synergist **Piperonyl Butoxide**. Furthermore **Piperonyl Butoxide**, thanks to its special properties, provides the benefit of allowing to reduce the amount of active ingredients involved in the formulation, resulting in more cost effective products.

*The graph shows the effect of adding Piperonyl Butoxide at different synergic ratios to Transfluthrin 0.02%: a significant enhancement of Knock-Down, defined as the number of insects paralysed in a fixed time, and an outstanding increase of mortality rates may be observed.*



## APPLICATIONS

**COILS** The recommended dosages for use in coils are between 0.02 and 0.04%. Apart from the extremely low amounts required to be effective, Transfluthrin offers several additional advantages, such as:

- quick anti-biting effect from the first instants of burning
- no product waste during the whole

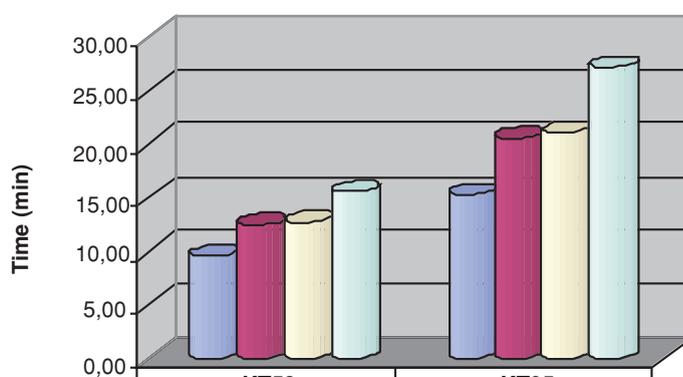
working time: **it evaporates completely before being burned**, unlike other pyrethroids that are partially lost in the burned ash

- proved efficacy, even against tolerant mosquitoes
- a 6 to 10 times higher effectiveness than *d-Allethrin*

The graphs show the comparative efficacy results of commercial coils on *Culex Pipiens* and *Aedes Albopictus* (Tiger Mosquito) in terms of KT50 and KT95.

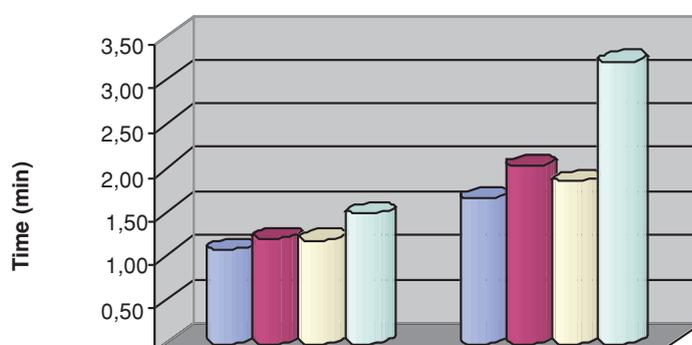
KT50 (95) is defined as the knockdown time in minutes recorded for the 50% (95%) of test insects

**COILS EFFICACY on Culex Pipiens**



	KT50	KT95
TRANSFLUTHRIN 0,03%	9,53	15,23
d-ALLETHRIN 0,2%	12,47	20,59
d-trans ALLETHRIN 75/25 0,1%	12,69	21,07
PRALLETHRIN 0,044%	15,49	27,14

**COILS EFFICACY on Aedes Albopictus**



	KT50	KT95
TRANSFLUTHRIN 0,03%	1,06	1,65
d-ALLETHRIN 0,2%	1,19	2,02
d-trans ALLETHRIN 75/25 0,1%	1,17	1,85
PRALLETHRIN 0,044%	1,48	3,21

# TRANSFLUTHRIN

## APPLICATIONS

**MATS** The advisable dosages to guarantee an effective insecticidal activity in mats applications are 10-13 mg per mat.

Owing to its fast evaporation, Transfluthrin can be used in cellulose made supports with low temperature heaters or in special plastic supports (chips) with normal heaters.

Transfluthrin can also be used efficiently at lower levels in combination with *d-Allethrin* in cellulose made supports with normal heaters: in fact, thanks to its quick evaporation, Transfluthrin provides an immediate “cleaning” and antibiting effect in the room, while *d-Allethrin* keeps on working overnight.

**LEDS** The recommended dosage for liquid vaporizers is 0.88% in hydrocarbon solution.

The main advantages of Transfluthrin for this application are:

- constant evaporation rates, thus **constant performances** over the whole claimed working time
- no clogging of the wick and therefore

a complete consumption of the liquid

- a perfect control **from the first instants** of working time
- a more than 2 times higher effectiveness than *Esbiothrin* and *Prallethrin* on mosquitoes

## AMBIENT VAPORIZERS

Transfluthrin is suitable for the development of innovative products working at room temperature (indoor strips, portable devices, etc.) with **efficacy comparable to COILS**.

## ANTI-MOTH products for clothes protection

Transfluthrin is the best performing and cost effective active ingredient on the market for this application. It can be formulated both in aerosol and solid products such as impregnated papers, moth bags, etc.

Comparative tests performed on paper strips show an efficacy that is much higher than *Empenthrin* in terms of: dosage, duration, biological efficacy (preventive effect, larvae killing, hatching inhibition, adults repellence)

## APPLICATIONS

Testing for action against adult *Tineola Bisselliella* and the larvae hatched from the eggs laid

AI/m <sup>2</sup> paper	Wk0	Wk1	Wk2	Wk6	Wk12	Wk20	Wk26
0.2 g Transfluthrin	1d (0) ND	1d (0) ND	1d (0) ND	1d (0) ND	1d (5) ND	1d (1) ND	1d (30) ND
1.6 g Empenthrin	1d (0) ND	1d (0) ND	1d (0) ND	1d (50) Holes	Holes	Holes	Holes

Days (d) taken to reach 100% mortality; Number (-) of larvae hatched from the eggs laid; Feeding damage: Holes or ND (not detected)

The table shows that 0.2 g AI /m<sup>2</sup> Transfluthrin paper is sufficient for providing 100% protection for 26 weeks against clothes-moths and feeding damage by L1 larvae. With Empenthrin at 1.6 g AI /m<sup>2</sup>, the protection lasts only 2-4 weeks.

# TRANSFLUTHRIN

## TOXICOLOGY

Several toxicological studies carried out by Bayer AG, demonstrate the superior product safety of TRANSFLUTHRIN

<b>Acute toxicity:</b>	LD <sub>50</sub> oral (rat)	:	>5000 mg/kg
	LD <sub>50</sub> dermal (rat)	:	>5000 mg/kg
	LD <sub>50</sub> inhalation (rat)	:	>513 mg/m <sup>3</sup> air
<b>Irritancy:</b>	Eye irritancy	:	Non irritating
	Skin irritancy	:	Non irritating
<b>Sensitisation:</b>	Skin sensitisation	:	Non sensitising
<b>Long term toxicity:</b>	Non teratogenic, non mutagenic, non carcinogenic		

## PACKAGING

TRANSFLUTHRIN is classified and labelled in accordance with the relevant European Norms and it is

supplied in Bayer CropScience's original packaging

- 5 kg drums
- 30 kg drums

## STORAGE AND HANDLING

If properly stored in original sealed packaging and kept away from direct sunlight, Transfluthrin has a shelf-life of at least 3 years from the manufacturing date.

Storage, handling, disposal and transport information are reported on the relevant Material Safety Data Sheet (MSDS)

***Bayothrin® is a Bayer CropScience product***

**NOTE:** The reported information is, to the best of our knowledge, as accurate and complete as possible and is given in good faith but without warranty from our part

