d-PHENOTHRIN
SAFETY DATA SHEET

Date of issue: January 1st, 2007 — Former edition date: April 1st, 2006

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY/UNDERTAKING (*)

1.1 Identification of the substance:

Trade name:	d-Phenothrin
Chemical names:	• 3-phenoxybenzyl (1R)-cis,trans-2,2-dimethyl-3-(2-methylprop-1-enyl) cyclopropanecarboxylate (IUPAC) • d-phenothrin (international common name); phenothrin (for racemic mixture; ISO, 1750 - published) • Cyclopropanecarboxylic acid, 2,2-dimethyl-3-(2-methyl-1-propenyl)-, (3-phenoxyphenyl) methyl ester, (1R)- (CA INDEX NAME, 9CI)
Other names:	Phenothrin, Sumithrin ® (trade name registered by Sumitomo Chem. Co.)
CAS No.:	188023-86-1 (26002-80-2 for unresolved stereochemistry).
EC No.:	247-404-5
Chemical Family:	Pyrethroid
Molecular Formula:	$C_{23}H_{26}O_3$
Molecular Mass:	350.46
1.2 Use of the substance:	Active ingredient for insecticide formulations.
1.3 Company/undertaking identification	
Name and address:	ENDURA S.p.A. - Viale Pietramellara, 5 - 40121 Bologna (Italy)
Telephone Number / Telefax Number:	+39 051 5281711 / +39 051 557255
E-mail address of the competent person responsible:	atagliani@endura.it
1.4 Emergency telephone:	+39 348 8073239 (ENDURA S.p.A. - Viale Pietramellara, 5 - 40121 Bologna - Italy); otherwise, contact the official competent body of the Member State where the emergency has occurred.

2. HAZARDS IDENTIFICATION (*)

According to Directive 67/548/EEC and all subsequent amendments, the substance d-phenothrin is classified as follows:

N, Dangerous for the environment; R50/53.

The substance is not classified as hazardous to man, whereas it may cause hazards to various aquatic species.

The information appearing on the label is reported in Section 15.

3. COMPOSITION/INFORMATION ON INGREDIENTS (*)

The commercial product “d-Phenothrin” contains 92% or more of stereoisomers of the substance phenothrin and no intentionally added hazardous ingredients.

4. FIRST AID MEASURES

Inhalation:	Move affected person from contaminated area to fresh air. If the affected person is not breathing, provide artificial respiration. In the case of laboured breathing, provide oxygen and obtain medical aid.
Skin contact:	Remove contaminated clothing and wash affected areas with plenty of water and soap. Contact a physician if irritation occurs.
Eye contact:	Remove contact lenses, if present. Flush eyes with plenty of water for 15 minutes. Try to open the eyelids. It is advisable to contact a physician if irritation persists.
Ingestion:	Contact a poison control centre or a physician immediately. Administer the injured person 1 or 2 glasses of water, if conscious. Vomiting may be induced, keeping the injured's head bent down, in order to prevent vomit inhalation through the respiratory apparatus. Do not administer anything to unconscious people.

5. FIRE-FIGHTING MEASURES (*)

Suitable extinguishing media:	Foam, CO_2, chemical powders, water mist.
Unsuitable extinguishing media:	Jets of water.
Special exposure hazards in a fire:	As for all organic materials, combustion may lead to formation of hazardous oxides of carbon and other toxic fumes.
Special protective equipment for fire-fighters:	Wear a self-contained respiratory apparatus; wear protective clothing in order to avoid contact with the skin and the eye.
Other instructions:	Cool fire-exposed containers with water mist and avoid environmental contamination with extinguishing water.

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6. ACCIDENTAL RELEASE MEASURES(*)

Personal precautions:	Wear suitable clothing as reported in Heading 8.
Environmental precautions:	Avoid soil and water contamination. In the case of environmental contamination, inform the authorities.
Methods for cleaning up:	Soak up with sand or other absorbent material; collect thoroughly into suitable containers. Wash the contaminated area with a soapy solution; collect waste waters for treatment.

7. HANDLING AND STORAGE (*)

7.1 Handling:	Handle only when suitable ventilation is available. Avoid contact with eyes, skin and clothing. Wash hands and exposed skin after work. Do not eat, drink or smoke during use.
7.2 Storage	
Requirements of storage rooms:	The product is not affected by the variation of temperature normally reached in a warehouse owing to seasonality. However, it should be stored in a closed, dry and well-ventilated area. Electrical equipment in warehouses or formulation departments should conform to the local norms for combustible products.
Storage conditions:	Keep away from food, drinks or animal feedingstuffs. Protect from light, heat and naked flames. The substance is stable under normal atmospheric conditions and has a shelf life of minimum 3 years from manufacturing, if properly packed and stored. Storage in closed containers is recommended, preferably in those adopted by the supplier (i.e. UN approved steel drums lined with epoxy-phenolic resins). Do not stack palletised drums in more than 3 vertical layers.
Packaging material to be avoided:	Unlined iron and other metals (copper, brass, bronze).
Recommended packaging material:	Polyethylene (in particular F-HDPE, HDPE or co-extruded PE); dark glass; coated steel (epoxy-phenolic or polyvinyl-fluoride resins). Only for short period storages: other plastic materials, tinplate, lined steel or aluminium.
7.3 Specific uses:	The substance is not intended for end-users, but to the chemical industry only.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION (*)

8.1 Exposure limit values:	No specific limit value (i.e. STEL, TWA, etc.) has been officially established for the substance. A calculated value, with a safety factor of 100, is the following: AOEL (Acceptable Operator Exposure Level): 0.0824 mg/kg bw/day
8.2 Exposure controls	
8.2.1 Occupational exposure controls:	Appropriate equipment should be used. In particular, a safety eyebath should be available at the workplace as well as localised ventilation systems. These should be designed for maintaining the eventual concentration of product in the air below the limit established by the local norms.
(a) Respiratory protection:	If fixed ventilation systems are not available, a mask with filter for organic vapours/particles should be worn during use (it is advisable to adopt devices complying with the EN 14387:2004 and EN 149:2001 norms).
(b) Hand protection:	Suitable rubber gloves (nitrile, vinyl or neoprene) should be worn during use; it is advisable to adopt devices complying with the EN 374-1,2,3:2003 norms (recommended protection factor 4). Avoid getting gloves soaked and replace if contaminated.
(c) Eye protection:	Safety glasses or goggles should be worn during use (it is advisable to adopt devices complying with the EN 166:2001 norm).
(d) Skin protection:	Wear suitable clothing; it is advisable to adopt devices complying with the EN 340:2003 norm. Regarding rubber boots and aprons, it is possible to refer to the EN ISO 20345:2004 and EN 14605:2005 norms respectively. Avoid getting boots soaked; replace contaminated clothing.
8.2.2 Environmental exposure controls:	Vapours should be conveyed to suitable scrubbing systems.

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9. PHYSICAL AND CHEMICAL PROPERTIES (*)

9.1 General information	
Appearance; odour:	Yellow to yellow-brown transparent viscous liquid; slight aromatic odour.
9.2 Important information	
pH:	The pH of an 1% aqueous emulsion is about 6.2 at 20 °C.
Boiling point/boiling range:	No boiling point or decomposition phenomena were observed up to 300 °C.
Flash point:	150 °C (Pensky-Martens closed test)
Explosive or Oxidising properties:	Non-explosive; not applicable.
Vapour pressure:	< 3.0 x 10^{-7} hPa at 25 °C
Relative density:	1.06 at 20 °C
Solubility in water:	< 5 µg/L at 20 °C
Solubility in organic solvents:	> 1 kg/L (n-hexane and methanol) at 25 °C
Partition coefficient n - octanol/water:	Log P_{ow} > 5.84
9.3 Other information	
Freezing point; freezing range:	- 20 °C; phenomena of crystallization were noted from - 28 to - 32 °C.
Auto-ignition temperature:):	395 °C

10. STABILITY AND REACTIVITY

10.1 Conditions to avoid:	The substance is not sensitive to shock, moisture, pressure or temperature. Sources of ignition should however be avoided. Do not expose to temperatures higher than 60 °C in order to avoid the degradation of lined containers. Do not expose to light for avoiding loss of the substance concentration.
10.2 Materials to avoid:	The substance degrades when in contact with strong alkalis and acids, without generating hazardous products.
10.3 Hazardous decomposition products:	Combustion is the only reaction that may lead to hazardous decomposition products (i.e. oxides of carbon and other toxic fumes).

11. TOXICOLOGICAL INFORMATION (*)

Acute Oral Toxicity:	LD_{50} (rat): 5000 mg/kg bw (cut off value)
Acute Dermal Toxicity:	LD_{50} (rat): > 2000 mg/kg bw
Acute Inhalatory Toxicity:	LC_{50} (rat): > 5.3 mg/L air (4 h)
Corrosion:	Non-corrosive.
Eye and Dermal Irritation:	Non-irritating.
Skin sensitisation:	Non-sensitising.
Long-term toxicity:	Non-teratogenic, non-mutagenic, non-carcinogenic, non-toxic to reproduction.

12. ECOLOGICAL INFORMATION (*)

12.1 Ecotoxicity	
Acute toxicity to fish:	LC_{50} (*Brachydanio rerio*): 55.9 µg/L (96 h)
Acute toxicity to aquatic invertebrates:	IC_{50} (*Daphnia magna*): 4.6 µg/L (48 h)
Toxicity to algae:	EC_{50} (*Scenedesmus subspicatus*): > 5 mg/L (72 h)
Acute toxicity to birds:	LD_{50} (*Colinus virginianus*): > 2510 mg/kg
Acute toxicity to beneficial insects:	LD_{50} : 0.005 µg/bee (48 h)
Effects on microbiological activity in sewage treatment plants:	No significant inhibitory effect (< 15%) on microbiological activity occurs at concentrations up to and including 1000 mg/L.
12.2 Mobility	
Surface tension:	66.1 mN/m at 20° C for saturated aqueous solution
Adsorption/desorption on soil:	The value of the log Koc (5.2) indicates that the substance is immobile and remains preferably in soil.
12.3 Persistence and degradability	
Biodegradability:	No degradation occurs after 28 days incubation.
Hydrolysis; photolysis:	The d-trans isomer of Phenothrin (80%) is stable; it has approx. the following values of DT_{50}: 60-300 d (pH 5), 90-620 d (pH 7) and 90-120 d (pH 9). Rapid photo-oxidative degradation in the atmosphere by reaction with photochemically-produced hydroxyl radicals (DT_{50} of 1.2 h) and ozone (DT_{50} of 38 min).
12.4 Bioaccumulative potential	
Bioconcentration:	BCF (Koc = 56.000): 266. Although this estimated value suggests that the potential for bioconcentration in aquatic organisms is high, existing studies on similar compounds suggest that bioconcentration may be lower that indicated by BCF value due to the ability of aquatic organisms to readily metabolise this class of compounds.
12.5 Results of PBT assessment	Not available.
12.6 Other adverse effects	None.

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13. DISPOSAL CONSIDERATIONS(*)

Product:	Product wastes belong to class H14 (eco-toxic wastes) and should be disposed of in accordance with the relevant European norms. Incineration is suggested.
Empty packaging:	Empty containers are considered waste of the same class of the contents and should be disposed of in accordance with the relevant European norms.

14. TRANSPORT INFORMATION

Transport within user's premises:	Normal precautions for stable and non-reactive products should be adopted.
Transport outside user's premises (identification, classification, packaging group)	
Land transport:	UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (d-Phenothrin), 9, III. Kemler Code: 90.
Sea transport:	Not scheduled; it may be considered a marine pollutant.
Air transport:	Not scheduled.

15. REGULATORY INFORMATION (*)

Classification:	N; R50/53.
Health, safety and environmental information shown on the label (self-classification)	
Warning Symbols:	N: Dangerous for the environment.
Risk phrases:	R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety advice:	S60: This material and its container must be disposed of as hazardous waste. S61: Avoid release to the environment. Refer to special instructions/safety data sheets.

16. OTHER INFORMATION (*)

Technical contact point:	Additional information for complying with national regulations on the approximation of standards, laws or administrative provisions throughout the Community may be provided upon request by ENDURA S.p.A., Viale Pietramellara, 5 - 40121 Bologna - Italy.
Sources of key data:	- Studies sponsored by Endura. - BPD Dossier as amended up to the latest version. - The Pesticide Manual, 13th Ed. - WHO, Environmental Health Criteria 96 (1990). - National Library of Medicine Toxicology Data Network, Hazardous Substances Data Base, HSDB No. 3922 (last review: 31/03/2003). - ADR/RID 2007. - IMDG (IMO) Code 2004 Ed., Amend. 32-04. - DGR (IATA) 48th Ed., apart from relevant State and Operator Variations.
Revised information in respect to the previous edition:	The sections in which information has been added, deleted or revised have been marked with **(*)**.

This sheet has been issued with the purpose of providing users with the information necessary for a proper handling and storing of the substance and has been compiled with specific reference to the guidelines established by Directives 67/548/EEC, 89/686/EEC, 91/155/EEC, 91/689/EEC, 94/62/EC, 98/24/EC as amended up to the date of the present edition.
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