



MATERIAL SAFETY DATA SHEET

BAYER CORPORATION
AGRICULTURE DIVISION
P.O. Box 4913 Hawthorn Road
Kansas City, MO 64120-001

TRANSPORTATION EMERGENCY:

CALL CHEMTREC: (800) 424-9300
DISTRICT OF COLUMBIA: (202) 483-7616

NON-TRANSPORTATION:

BAYER EMERGENCY PHONE: (800) 414-0244
BAYER INFORMATION PHONE: (800) 842-8020

1. PRODUCT IDENTIFICATION:

PRODUCT NAME: TEMPO 2 EC
PRODUCT CODE: 21636
EPA REGISTRATION NO.: 3125-352 & 3125-372
CHEMICAL FAMILY: Pyrethroid Insecticide
CHEMICAL NAME: Cyano(4-fluoro-3-phenoxyphenyl)methyl 3-(2,2 - dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate
SYNONYMS: Cyfluthrin
FORMULA: C22 H18 Cl2 F N O3

2. HAZARDOUS INGREDIENTS:

INGREDIENT NAME	EXPOSURE LIMITS	CONCENTRATION (%)
TEMPO (cyfluthrin)		24 %
68359-37-5	OSHA : Not Established ACGIH: Not Established	
Cyclohexanone		30-40 %
108-94-1	OSHA : 25.000 ppm TWA (skin) ACGIH: 25.000 ppm TWA (skin)	
Ingredient 1975		3-5 %
Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	
Naphthalene		3-5 %
91-20-3	OSHA : 10.000 ppm TWA ACGIH: 10.000 ppm TWA	
Ingredient 1510		30-40 %
Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	
Ingredient 2037		3-5 %
Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	

3. PHYSICAL PROPERTIES:

PHYSICAL FORM: Liquid
APPEARANCE: Clear
COLOR: Dark amber
ODOR: Aromatic
ODOR THRESHOLD: Not established
MOLECULAR WEIGHT: 434.3 (for cyfluthrin)
pH: Not established
BOILING POINT: Not established
MELTING/FREEZING POINT: 20 °F
SOLUBILITY IN WATER: 2 ppb @ 20 °C (for cyfluthrin)
SPECIFIC GRAVITY: 0.99 g/cc @ 20 °C/20 °C
BULK DENSITY: Not applicable
% VOLATILE BY VOLUME: Not established
VAPOR PRESSURE: 3.3 x 10⁻⁸ mm Hg @ 20 °C (for cyfluthrin)
VAPOR DENSITY: Not established (Air = 1)

4. FIRE AND EXPLOSION DATA:

FLASH POINT: 117 °F (Setaflash)
FLAMMABLE LIMITS:
UPPER EXPLOSIVE LIMIT (UEL)(%): Not established
LOWER EXPLOSIVE LIMIT (LEL)(%): Not established
EXTINGUISHING MEDIA: Foam; Dry Chemical
SPECIAL FIRE FIGHTING PROCEDURES: Keep out of smoke. Cool exposed containers with water spray. Fight fire from upwind position. Use self-contained breathing equipment. Contain runoff by diking to prevent entry into sewers or waterways. Equipment or materials involved in pesticide fires may become contaminated.

5. HUMAN HEALTH DATA:

ROUTE(S) OF ENTRY: Dermal contact and inhalation of the product are the primary routes of entry. This material can be absorbed through the skin.

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE EFFECTS OF EXPOSURE: Severe eye irritation may occur from contact with the liquid resulting in tearing and/or reddening of the eyes. Moderate skin irritation may also occur from contact with the liquid and produce symptoms such as itching, skin reddening or rash. Paraesthesia (a tingling or burning sensation on the surface of the skin) may also result from skin contact. This is a frequently reported symptom associated with sufficient dermal exposure to alpha-cyano (or Type II) synthetic pyrethroids and normally subsides without treatment within 24 hours. Mucous membrane irritation involving the nose, throat and upper respiratory tract may occur from inhalation of aerosols during end use of the product such as spray application. This product contains aromatic hydrocarbon solvents. High vapor concentrations (greater than approximately 1000 ppm) can be irritating to the eyes, nose and throat, and may cause headaches, dizziness, nausea, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including

HUMAN HEALTH DATA continued:

death. Studies have shown that a similar formulation of this material is a dermal sensitizer in animals. Refer to the Animal Toxicity Data (Section XII) for additional information.

CHRONIC EFFECTS OF EXPOSURE: Based on animal studies, no adverse effects or symptoms would be expected from chronic exposure to the active ingredient in this product during normal use. However, repeated skin contact may result in defatting of the skin by the solvents in the product which can lead to redness and irritation of the skin. Chronic overexposure to these solvent components may cause mucous membrane irritation, nausea, headache, loss of appetite, weakness and alcohol intolerance.

CARCINOGENICITY: This product is not listed by NTP, IARC or regulated as a carcinogen by OSHA.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: No specific medical conditions are known which may be aggravated by exposure to the active ingredient in this product. As with all materials which can cause upper respiratory tract irritation, persons with a history of asthma, emphysema, or hyperreactive airway disease may be more susceptible to overexposure. Certain skin conditions may also be aggravated by repeated contact with the solvents in this mixture.

6. EMERGENCY AND FIRST AID PROCEDURES:

FIRST AID FOR EYES: Hold eyelids open and flush with copious amounts of water for 15 minutes. Seek medical attention immediately.

FIRST AID FOR SKIN: Remove contaminated clothing. Wash skin with soap and water. Get medical attention if irritation develops or persists. If signs of intoxication (poisoning) occur, get medical attention immediately.

FIRST AID FOR INHALATION: If a person is overcome by excessive exposures to aerosols or vapors of this material, remove to fresh air or uncontaminated area. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention as soon as possible.

FIRST AID FOR INGESTION: If ingestion is suspected, call a physician or poison control center. If medical assistance cannot be given immediately, drink promptly large quantities of water. DO NOT induce vomiting. Seek medical attention. Avoid alcohol. Do not attempt to give anything by mouth to an unconscious or convulsing person.

NOTE TO PHYSICIAN: ANTIDOTE - No specific antidote is available. Treat victim symptomatically. Published data indicate vitamin E acetate can prevent and/or mitigate symptoms of paraesthesia caused by synthetic pyrethroids. When treating the poisoning victim, be aware that this formulation contains 30-40% aromatic petroleum distillates. Minute amounts aspirated into the lungs during ingestion or vomiting can cause mild to severe pulmonary injury and possibly death. In case of poisoning, it is also requested that Bayer Corp., Agriculture Division, Kansas City, Missouri, be notified. Telephone: 816/242-2582

7. EMPLOYEE PROTECTION RECOMMENDATIONS:

EYE PROTECTION REQUIREMENTS: Splash-proof goggles or faceshield should be used to prevent liquid splashes from getting into the eyes.

SKIN PROTECTION REQUIREMENTS: Avoid skin contact. Use chemical-resistant gloves, boots or shoe covers, and apron to prevent dermal exposure.

RESPIRATOR REQUIREMENTS: If needed to prevent respiratory irritation, wear an organic vapor respirator with dust and mist filter approved by the National Institute for Occupational Safety and Health (NIOSH) or a NIOSH-approved pesticide respirator.

VENTILATION REQUIREMENTS: Maintain exposure levels below exposure limits through use of general and local exhaust ventilation.

ADDITIONAL PROTECTIVE MEASURES: Clean water and soap should be available for washing in case of eye or skin contamination. Educate and train employees in safe use of the product. Follow all label instructions. Launder clothing separately after use. Wash thoroughly after handling.

8. REACTIVITY DATA:

STABILITY: This is a stable material.

HAZARDOUS POLYMERIZATION: Will not occur.

INCOMPATIBILITIES: Alkaline media; reacts with methanol; incompatible with most disinfectants

INSTABILITY CONDITIONS: Not Noted

DECOMPOSITION PRODUCTS: Not established

9. SPILL AND LEAK PROCEDURES:

SPILL OR LEAK PROCEDURES: Isolate area and keep unauthorized people away. Do not walk through spilled material. Avoid breathing vapors and skin contact. Remove sources of ignition if combustible or flammable vapors may be present and ventilate area. Wear proper protective equipment. Dike contaminated area with absorbent granules, soil, sand, etc. If large spill, material should be recovered. Small spills can be absorbed with absorbent granules, spill control pads, or any absorbent materials. Carefully sweep up absorbed spilled material. Place in covered container for reuse or disposal. Scrub contaminated area with detergent and bleach solution and/or detergent and lye in water solution. Repeat. Rinse with water. Use dry absorbent material such as clay granules to absorb and collect wash solution for proper disposal. Contaminated soil may have to be disposed. Do not allow material to enter streams, sewers, or other waterways or contact vegetation.

WASTE DISPOSAL METHOD: Follow container label instructions for disposal of wastes generated during use in compliance with the FIFRA product label. In other situations, burn in a RCRA hazardous waste incinerator. Do not reuse container unless authorized by Bayer Corp.

10. SPECIAL PRECAUTIONS & STORAGE DATA:

STORAGE TEMPERATURE(MIN/MAX): 0 °F/30 day average not to exceed 100 °F

SHELF LIFE: Not Noted

SPECIAL SENSITIVITY: Heat, moisture

HANDLING/STORAGE PRECAUTIONS: Store in a cool, dry area designated specifically for pesticides. Do not store near any material intended for use or consumption by humans or animals.

11. SHIPPING INFORMATION:

TECHNICAL SHIPPING NAME: Cyfluthrin

FREIGHT CLASS BULK: Insecticides, NOI - NMFC 102100

FREIGHT CLASS PACKAGE: Insecticides, NOI - NMFC 102100

PRODUCT LABEL: Not Noted

DOT (DOMESTIC SURFACE):

PROPER SHIPPING NAME: Pesticide, Liquid, Toxic, Flammable, N.O.S. (cyfluthrin/cyclohexanone)

HAZARD CLASS OR DIVISION: 6.1

UN/NA NUMBER: UN2902

PACKAGING GROUP: PG III

DOT PRODUCT RQ lbs (kgs): None

HAZARD LABEL(s): Keep Away From Food

HAZARD PLACARD(s): Keep Away From Food; Flammable

IMO / IMDG CODE (OCEAN):

PROPER SHIPPING NAME: Pesticide, Liquid, Toxic, Flammable, N.O.S. (cyfluthrin/cyclohexanone)

HAZARD CLASS DIVISION NUMBER: 6.1

UN NUMBER: UN2902

PACKAGING GROUP: III

HAZARD LABEL(s): Keep Away From Food; Flammable Liquid

HAZARD PLACARD(s): Keep Away From Food; Flammable Liquid

SHIPPING INFORMATION continued:
ICAO / IATA (AIR):
PROPER SHIPPING NAME: Pesticide, Liquid, Toxic, Flammable, N.O.S.
 (cyfluthrin/cyclohexanone)
HAZARD CLASS DIVISION NUMBER: 6.1
UN NUMBER: UN2902
SUBSIDIARY RISK: 3
PACKING GROUP: III
HAZARD LABEL(s): Keep Away From Food; Flammable Liquid
RADIOACTIVE?: Non-Radioactive

12. ANIMAL TOXICITY DATA:
 Toxicity studies have not been performed on this product as formulated. The acute toxicity data provided have been extrapolated from a similar formulation of TEMPO 2. The non-acute information pertains to the active ingredient, cyfluthrin.

ACUTE TOXICITY:
ORAL LD50: Male rat: 647 mg/kg - Female rat: 695 mg/kg
DERMAL LD50: Male and Female Rabbit: >2000 mg/kg
INHALATION LC50: 4 hr exposure to Liquid Aerosol: Male Rat: 0.716 mg/L (analytical) -- Female Rat: 0.924 mg/L (analytical); 1 hr exposure to Liquid Aerosol: Rat: Greater than 2.029 mg/L (analytical)
EYE EFFECTS: Rabbit: Severe eye irritant with irritation persisting through 21 days.
SKIN EFFECTS: Rabbit: Moderate dermal irritant.
SENSITIZATION: Guinea pig: Positive dermal sensitizer

SUBCHRONIC TOXICITY:
 In a 3 week dermal toxicity study, the active ingredient, cyfluthrin, was administered at 50 or 250 mg/kg to the back of rabbits for 6 hours/day, 5 days/week. There were no local or systemic effects observed in the treated rabbits. The no-observed-effect-level (NOEL) was equal to or greater than 250 mg/kg. In a 13 week inhalation study, rats were exposed to cyfluthrin at aerosol concentrations of 0.09, 0.71 or 4.51 mg/cubic meter for 6 hours/day, 5 days/week. The NOEL was 0.09 mg/cubic meter based on reduced body weight gains.

CHRONIC TOXICITY:
 Cyfluthrin was administered for 2 years to rats at dietary concentrations of 50, 150 or 450 ppm. Body weight gains were reduced at 150 ppm and greater. The NOEL was 50 ppm based on reduced body weight gains. Dogs were administered cyfluthrin for 1 year at dietary concentrations of 40, 160 or 640 ppm. At the high dose, there was an increased incidence of clinical signs and a reduction of body weight gains. The NOEL was 160 ppm. Preliminary data are available on an ongoing dog study. Dogs were administered cyfluthrin at dietary concentrations of 50, 100, 360 or 500 ppm for 1 year. Mid-term neurological examinations revealed hind-limb motor disturbances at dose levels of 360 ppm and greater.

CARCINOGENICITY:
 Cyfluthrin was investigated for carcinogenicity in chronic studies using rats and mice at maximum levels of 450 and 800 ppm, respectively. There was no evidence of a carcinogenic potential observed in either species.

MUTAGENICITY:
 Numerous in vitro and in vivo mutagenicity studies have been conducted on cyfluthrin, all of which are negative.

DEVELOPMENTAL TOXICITY:
 In teratology studies using rats, cyfluthrin was administered during gestation by oral gavage at doses ranging from 1 to 30 mg/kg. The overall NOEL from these studies for maternal toxicity was 3 mg/kg. No developmental effects were observed at any of the doses tested. In each study the NOEL for developmental toxicity was equivalent to the highest dose tested. The NOELs for developmental toxicity for the initial study and the subsequent

ANIMAL TOXICITY DATA continued:
 study were 30 and 10 mg/kg, respectively. Rabbits were administered cyfluthrin during gestation by oral gavage at doses ranging from 5 to 180 mg/kg. At maternally toxic levels, there was an increased incidence of post-implantation losses. The overall NOEL derived from these studies for both maternal and developmental toxicity was 20 mg/kg. In an inhalation study, rats were exposed during gestation to cyfluthrin at aerosol concentrations of 0.46, 2.55 or 11.9 mg/m³ for 6 hours/day. NOELs for maternal and developmental toxicity were less than 0.46 and 0.46 mg/m³, respectively.

REPRODUCTION:
 In a reproduction study, cyfluthrin was administered to rats for 3 generations at dietary concentrations of 50, 150 and 450 ppm. Reproductive effects observed at parentally toxic levels included reductions in viability, lactation, litter size, feed consumption, and pup birth weights and body weight gains. Coarse tremors were observed in some offspring at 450 ppm. The NOEL for both parental and reproductive effects was 50 ppm. In another reproduction study, cyfluthrin was administered to rats for 2 generations at dietary concentrations of 50, 125 or 400 ppm. The in-life portion of the study has been completed and preliminary results indicate a marginal decrease in viable pup weights from birth through Day 7 at 50 ppm. This is the only effect noted in pups at the low dose and occurred only in the F2a-generation. The biological relevance of this equivocal finding awaits full completion of the study.

NEUROTOXICITY:
 Numerous neurotoxicity studies have been conducted on cyfluthrin. Oral gavage studies using hens have indicated that at extremely high dose levels (5000 mg/kg), minimal nerve damage occurs. When rats were administered cyfluthrin daily at oral doses of 40 to 80 mg/kg for 14 days, minimal nerve effects were seen. These effects were completely reversible within a 3 month recovery period. In dermal and inhalation studies which are more relevant to field exposure, there was no evidence of delayed neurotoxicity in hens.

13. FEDERAL REGULATORY INFORMATION:
OSHA STATUS: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
TSCA STATUS: This product is exempt from TSCA Regulation under FIFRA Section 3 (2)(B)(ii) when used as a pesticide.
CERCLA REPORTABLE QUANTITY: 2941 pounds of formulation which contains 100 pounds of naphthalene; 14,600 pounds of formulation which contains 5000 pounds of cyclohexanone
SARA TITLE III:
SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES: None
SECTION 311/312 HAZARD CATEGORIES: Immediate Health Hazard; Delayed Health Hazard; Fire Hazard
SECTION 313 TOXIC CHEMICALS: Naphthalene - 3.4% (CAS No. 91-20-3); Cyfluthrin - 24% (CAS No. 68359-37-5)
RCRA STATUS: When discarded in its purchased form, this product meets the criteria of ignitability, and should be managed as a hazardous waste (EPA Hazardous Waste Number D001). (40 CFR 261.20-24)

14. OTHER REGULATORY INFORMATION:
NFPA 704M RATINGS:
 Health: 2 Flammability: 2 Reactivity: 0 Other:
 0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme
 Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. NFPA ratings are provided by Bayer Corporation as a customer service.

15. APPROVALS:

REASON FOR ISSUE: Create MSDS to reflect new formulation of
TEMPO 2

PREPARED BY: V. C. Standart

APPROVED BY: D. C. Eberhart

TITLE: Product Safety Manager

APPROVAL DATE: 12/13/95

SUPERSEDES DATE: None

MSDS NUMBER: 21953

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