Bayer CropScience

MATERIAL SAFETY DATA SHEET

BAYER ENVIRONMENTAL SCIENCE
A Business Group of BAYER CROPSCIENCE, LP
95 Chestnut Ridge Road
Montvale, NJ 07645

For MEDICAL, TRANSPORTATION or Other EMERGENCY call 1-800-334-7577 (24 hours/day)

For Product Information call 1-800-331-2867

1. CHEMICAL PRODUCT IDENTIFICATION:

PRODUCT NAME.....: TEMPO Ultra WP Insecticide
CHEMICAL FAMILY.....: Pyrethroid Insecticide
CHEMICAL NAME.....: Cyano(4-fluoro-3-phenoxyphenyl)methyl 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate
SYNONYMS.....: beta-Cyfluthrin
FORMULA.....: C22 H18 Cl2, F N O3
PRODUCT USE.....: Commercial Insecticide

2. COMPOSITION/INFORMATION ON INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
***** HAZARDOUS INGREDIENTS *****		
FCR 4545 Technical 68359-37-5	OSHA : Not Established ACGIH: Not Established	10 %
Ingredient 1968 Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	3-5 %
Total crystalline silica (quartz) 14808-60-7	OSHA : .10 mg/m3 TWA (respirable) ACGIH: .10 mg/m3 TWA (respirable)	<1 - 7.5 %

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3. HAZARDS IDENTIFICATION:

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* EMERGENCY OVERVIEW *
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* CAUTION! Color: Tan; Form: Powder; Odor: Slightly *
* aromatic; Harmful if inhaled; Harmful if absorbed through *
* skin; Causes eye irritation; Harmful if swallowed. *
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POTENTIAL HEALTH EFFECTS:

ROUTE(S) OF ENTRY.....: Inhalation; Skin Contact; Skin Absorption; Eye Contact

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE EFFECTS OF EXPOSURE.....: Skin and mucous membrane irritation may occur from contact with the product and produce symptoms such as itching, stinging, skin reddening or rash. Paresthesia (a tingling or burning sensation on the surface of the skin) may also result from skin contact. These are frequently reported symptoms associated with sufficient dermal exposure to alpha-cyano (Type II) synthetic pyrethroids and normally subside without treatment within 24 hours. The onset of these symptoms usually occurs 2-12 hours after exposure. The effects are temporary and are reversible. Based on the EPA Toxicity Category criteria, this material is mildly toxic by the oral and dermal routes of exposure. In addition, animal studies have shown that it can cause mild irritation to the conjunctiva of the eye with all irritation resolving within 7 days.

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. This product may contain an amount of total crystalline silica which ranges from less than 1% to approximately 7%. However, the amount of respirable crystalline silica is expected to be significantly lower based on data provided by the raw material manufacturer. Excessive long-term exposure to respirable crystalline silica may cause silicosis, a form of progressive pulmonary fibrosis. Severe and permanent lung damage may result.

CARCINOGENICITY.....: This product is not listed as a carcinogen by NTP or IARC, or regulated as a carcinogen by OSHA. However, it may contain crystalline silica (quartz), a substance which is classified by NTP as a Group 2 carcinogen and by IARC as a Group I carcinogen. Crystalline silica is a naturally-occurring mineral component of many sands and clays. Although controversial, the carcinogenic potential of crystalline silica must be considered if it is inhaled under excessive exposure conditions. However, the respirable portion of the silica which may be contained in this product is small, such that excessive inhalation exposure during normal conditions of use is unlikely.

NTP.....: Crystalline silica is classified as an NTP

Anticipated Human Carcinogen - "Substances or groups of substances that may reasonably be anticipated to be carcinogens."

IARC.....: IARC has classified crystalline silica as a Group 1 carcinogen. "There is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica (quartz) from occupational sources."

OSHA.....: Not regulated

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 airways disease may be more susceptible to a response at low concentration. In addition, pulmonary and respiratory diseases may be aggravated by exposure to respirable crystalline silica.

4. FIRST AID MEASURES:

FIRST AID FOR EYES.....: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

FIRST AID FOR SKIN.....: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

FIRST AID FOR INHALATION: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

FIRST AID FOR INGESTION.: Call poison control center or doctor immediately for treatment advice. Have a person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything to an unconscious person.

NOTE TO PHYSICIAN.....: ANTIDOTE: No specific antidote is available. Treat patient symptomatically. Published data indicate vitamin E acetate can prevent and/or mitigate symptoms of paresthesia caused by synthetic pyrethroids. In case of poisoning, call the emergency number on page 1.

5. FIRE FIGHTING MEASURES:

FLASH POINT.....: Not Applicable

FLAMMABLE LIMITS:

5. FIRE FIGHTING MEASURES (Continued)

UPPER EXPLOSIVE LIMIT (UEL)(%): Not applicable
LOWER EXPLOSIVE LIMIT (LEL)(%): Not applicable
EXTINGUISHING MEDIA.....: Water; Dry Chemical
SPECIAL FIRE FIGHTING PROCEDURES: If involved in fire, wear self-contained breathing apparatus and stay up wind.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES.....: Isolate area. Avoid breathing dusts and skin contact. Use recommended protective equipment while carefully sweeping up and place in covered container for re-use if possible. Scrub contaminated area with soap and water. Repeat and rinse with water. Prevent contamination of streams, sewers, or other waterways.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE(MIN/MAX): None/30 day average not to exceed 100 F
SHELF LIFE.....: Time/temperature dependent. Contact Bayer for specific information.
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.

8. PERSONAL PROTECTION:

EYE PROTECTION REQUIREMENTS.....: Goggles should be used when needed to prevent dust or spray mixture from getting into the eyes.
SKIN PROTECTION REQUIREMENTS.....: Avoid skin contact. Use chemical-resistant gloves, such as nitrile, and additional protective clothing when needed to prevent dermal exposure.
VENTILATION REQUIREMENTS.....: Control airborne concentrations through the use of general and local exhaust ventilation where needed.
RESPIRATOR REQUIREMENTS.....: Under normal handling conditions no respiratory protection is needed. However, if needed to prevent respiratory irritation, a NIOSH approved particulate respirator may be used.
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 after use. Wash thoroughly after handling.

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9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM.....: Powder
COLOR.....: Tan
ODOR.....: Slightly aromatic
ODOR THRESHOLD.....: Not Established
MOLECULAR WEIGHT.....: 434.3 (for cyfluthrin)
pH .....: 9.2 (1% Solution)
BOILING POINT.....: Not applicable
MELTING/FREEZING POINT....: Not applicable
SOLUBILITY IN WATER .....: 2 ppb (for cyfluthrin)
SPECIFIC GRAVITY .....: Not Applicable
BULK DENSITY.....: Approximately 30 lb/cu-ft
% VOLATILE BY VOLUME.....: Not established
VAPOR PRESSURE .....: 3.3 x 10 -8 mm Hg @ 20 C (for cyfluthrin)
VAPOR DENSITY .....: Not established (Air = 1)

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10. STABILITY AND REACTIVITY:

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

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11. TOXICOLOGICAL INFORMATION:

Acute toxicity studies have not been performed on TEMPO Ultra WP containing beta-cyfluthrin, the enriched isomer mixture of the active ingredient, cyfluthrin. Acute toxicology information provided below has been extrapolated from a similar formulation, TEMPO 20% Wettable Powder, containing cyfluthrin. The non-acute information pertains to BAY FCR 4545 (beta-cyfluthrin) and cyfluthrin technical.

ACUTE TOXICITY
ORAL LD50.....: Rat: >500 - 5000 mg/kg
DERMAL LD50.....: Rabbit: >2000 - 5000 mg/kg
INHALATION LC50....: 4 Hr. Exposure to Dust: Rat: >0.5 - 2.0 mg/l (analytical); 1 Hr. Exposure to Dust (extrapolated from 4 hr. LC50): Male and Female Rat: >2.0 - 8.0 mg/l (analytical)
EYE EFFECTS.....: Rabbit: Mild eye irritant resolving within 7 days.
SKIN EFFECTS.....: Rabbit: Slight dermal irritant.

11. TOXICOLOGICAL INFORMATION (Continued)

SENSITIZATION.....: Guinea Pig: The weight of evidence concludes the product is not a dermal sensitizer.

SUBCHRONIC TOXICITY...: BAY FCR 4545: In a 13 week dog study, BAY FCR 4545 technical was administered at dietary concentrations of 10, 60 or 360 ppm. Effects included vomiting and diarrhea after feeding, decreased body weight gain, and motor disturbances in the hind limbs. The no-observed-effect-level (NOEL) was 60 ppm. In a 13 week study using rats, BAY FCR 4545 technical was administered at dietary concentrations of 30, 125 or 500 ppm. Effects included reduced body weight gains and feed consumption, uncoordinated gait, and skin injuries of the neck and head from excessive preening due to the local irritant effect of the test material. The NOEL was 125 ppm. In a 4 week inhalation study, rats were exposed to BAY FCR 4545 technical at liquid aerosol concentrations of 0.2, 2.7 or 23.5 mg/m3. Effects observed included ungroomed fur, piloerection, hyper- and hypoactivity, reduced body weight gains, reduced organ weights (thymus and spleen), and hematological changes. The NOEL was 0.2 mg/m3 based on decreased body weight gains. Cyfluthrin: In a 3 week dermal toxicity study, cyfluthrin technical was administered to rats for 6 hours/day at dose levels of 100, 340 or 1000 mg/kg. Animals received a total of 17-18 applications in a period of 22-23 days. An additional control and high-dose group were treated and maintained for 14-15 days following treatment so as to ascertain the extent of recovery. Effects observed included reduced feed consumption, red nasal discharge, urine stains, and findings at the dose site (scabbing, crusty, discolored and raised zones). Histologically, epidermal and dermal alterations in treated skin were observed in animals of the mid- and high-dose groups. Similar, but slightly less severe microscopic alterations were also observed in the high-dose recovery group. The overall NOEL was 100 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/m3 for 6 hours/day, 5 days/week. The NOEL was 0.09 mg/m3 based on reduced body weight gains.

CHRONIC TOXICITY.....: Cyfluthrin: Cyfluthrin has been investigated in chronic feeding studies using two different strains of rats. In each study, cyfluthrin was administered for 2 years at dietary concentrations ranging from 50 to 450 ppm. Body weight gains were decreased at concentrations of 150 ppm and greater. Changes in clinical chemistries occurred at 450 ppm. In one of the studies, histopathology revealed a numerical increase in mammary gland adenocarcinomas at 450 ppm. This finding was not statistically significant when compared to the controls and is not considered to be compound-related. In each study, the overall NOEL was 50 ppm based on decreased body weight gains. In a 1 year feeding study, dogs were administered cyfluthrin at dietary concentrations of 50, 100, 360 or 650 ppm. Beginning on week 8, the high-dose was reduced to 500 ppm for the remainder of the study due to severe clinical neurological symptoms. Body weights were decreased for animals of the high-dose. Neurological findings (gait abnormalities and postural reaction deficits) were observed at doses of 360 and greater. The NOEL was 100 ppm.

CARCINOGENICITY.....: Cyfluthrin: Cyfluthrin was investigated for carcinogenicity in chronic studies using several different strains of rats and mice. In rats, the maximum level tested was 450 ppm. Maximum levels tested in mice were 1400 and 1600 ppm for males and females, respectively. There was no evidence of a carcinogenic potential observed in any of the strains in

either species.

MUTAGENICITY.....: BAY FCR 4545: In vitro and in vivo mutagenicity studies have been conducted on BAY FCR 4545 technical, all of which are negative. Cyfluthrin: Numerous in vitro and in vivo mutagencity studies have been conducted on cyfluthrin, all of which are negative.

DEVELOPMENTAL TOXICITY: BAY FCR 4545: In a developmental toxicity study, BAY FCR 4545 technical was administered orally to rats during gestation at doses of 3, 10 or 40 mg/kg. At the lethal and maternally toxic dose of 40 mg/kg, there was a decrease in fetal body weights and an increased incidence of skeletal findings. The NOELs for maternal and developmental toxicity were 3 and 10 mg/kg, respectively. Cyfluthrin: In developmental toxicity 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 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.....: Cyfluthrin: 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, lacation, 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 were 50 ppm. In another reproduction study, cyfluthrin was administered to rats for 2 generations at dietary concentrations of 50, 125 or 400 ppm. Coarse tremors occurring in conjunction with parental toxicity were observed in the offspring in the mid- and high-dose groups. Based on this finding, the neonatal NOEL was 50 ppm. The NOELs for parental and reproductive toxicity were 50 and 400 ppm, respectively.

NEUROTOXICITY .....: BAY FCR 4545: In an acute neurotoxicity screening study using rats, BAY FCR 4545 technical was administered as a single oral dose at levels of 0.5, 2, or 10 mg/kg. Transient treatment-related clinical signs of toxicity and neurobehavioral effects were evident in both sexes. There were no treatment-related microscopic lesions within the skeletal muscle or neural tissues. Based on these results, the NOEL for neuropathology was 10 mg/kg for males and females, the highest dose tested. The overall NOEL for both sexes following acute oral exposure to BAY FCR 4545 technical was 0.5 mg/kg. In a 13 week neurotoxicity screening study, BAY FCR 4545 technical was administered to rats at dietary concentrations of 30, 125, or 400 ppm. Effects observed included reduced body weight and food consumption, ataxia, repetitive chewing and pawing, increased activity, and red nasal stain. There were no micropathologic findings within the skeletal muscle or neural tissues. The NOEL for subchronic neurotoxicity (systemic) was 125 ppm. The overall

NOEL was 30 ppm. Cyfluthrin: 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 neurotoxocity in hens. In a special investigative study, litters of neonatal mice (10 days of age) and their mothers were exposed to cyfluthrin via inhalation (whole body exposure). Mice were exposed to aerosol concentrations of 5, 15, or 50 mg/m3 for 6.3 hours/day for 7 successive days. Motor activity was measured in the offspring at 4 months of age (approximately 3.5 months post-exposure). At 50 mg/m3, all of the offspring died or were sacrificed in a moribund state following the first exposure. Mortalities were not observed at any of the other levels. Clincal symptoms were observed immediatley after exposure in young mice at 15 mg/m3, and included decreased motility, temporary scratching, and tonic convulsions. There was an increase in motor activity in mice at 15 mg/m3. Histopathological investigations did not reveal any treatment-related findings in mice at the age of 4 months.

12. ECOLOGICAL INFORMATION:

This product is toxic to fish. Bayer will provide a summary of specific data upon written request. As with any pesticide, this product should be used according to label directions and should be kept out of streams, lakes and other aquatic habitats of concern. In event of a spill emergency, call the number on page 1.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD.....: Follow all federal, state and local regulations. Bury material in EPA-approved landfill or burn in an incinerator approved for pesticide destruction. Do not reuse container.

14. TRANSPORTATION INFORMATION:

TECHNICAL SHIPPING NAME.....: Cyfluthrin
FREIGHT CLASS BULK.....: Insecticides, NOI - NMFC 102120
FREIGHT CLASS PACKAGE.....: Insecticides, NOI - NMFC 102120
PRODUCT LABEL.....: TEMPO Ultra WP Insecticide

14. TRANSPORTATION INFORMATION (Continued)

DOT (DOMESTIC SURFACE)

HAZARD CLASS OR DIVISION .....: Non-Regulated

IMO / IMDG CODE (OCEAN)

HAZARD CLASS DIVISION NUMBER...: Non-Regulated

ICAO / IATA (AIR)

HAZARD CLASS DIVISION NUMBER...: Non-Regulated

15. 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..: No components listed.

SARA TITLE III:

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES..: No components listed.

SECTION 311/312 HAZARD CATEGORIES.....: Immediate Health Hazard; Delayed Health Hazard

SECTION 313 TOXIC CHEMICALS.....: beta-cyfluthrin (10%) (CAS NO. 68359-37-5)

RCRA STATUS.....: If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

16. OTHER INFORMATION:

NFPA 704M RATINGS:	Health	Flammability	Reactivity	Other
	2	1	1	

0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

16. OTHER INFORMATION (Continued)

Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. NFPA ratings are provided by Bayer as a customer service.

REASON FOR ISSUE.....: Update address and phone numbers
PREPARED BY.....: T. M. Myers
APPROVED BY.....: S. E. Earnest
TITLE.....: Manager, Quality Systems Services
APPROVAL DATE.....: 09/22/2003
SUPERSEDES DATE.....: 11/04/2002
MSDS NUMBER.....: 23651