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. CHEMICAL PRODUCT IDENTIFICATION:

PRODUCT NAME: TEMPO 20% Wettable Powder

PRODUCT CODE: 21642

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. COMPOSITION/INFORMATION ON INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
******* HAZARDOUS INGREDIENTS *******		
TEMPO (cyfluthrin)		20 %
68359-37-5	OSHA : Not Established ACGIH: Not Established	
Ingredient 1968		1-5 %
Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	
Total crystalline silica (quartz)		<1 - 7 %
14808-60-7	OSHA : .10 mg/m3 TWA (respirable) ACGIH: .10 mg/m3 TWA (respirable)	

3. HAZARDS IDENTIFICATION:

EMERGENCY OVERVIEW CAUTION!

Color: Tan **Form:** Solid; Powder **Odor:** Slightly aromatic

Harmful if inhaled; Harmful if absorbed through skin; Causes eye irritation; Harmful if swallowed.

POTENTIAL HEALTH EFFECTS:

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

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE EFFECTS OF EXPOSURE: Mild eye or skin irritation may occur from contact with the powder or spray mixture. Paresthesia (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 (Type II) synthetic pyrethroids and normally subsides without treatment within 24 hours. The onset of these symptoms usually occurs 2-12 hours after exposure. 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 during a spray application.

HAZARDS IDENTIFICATION continued:

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 if 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 eyelids open and flush with a steady, gentle stream of water for 15 minutes. Get medical attention.

FIRST AID FOR SKIN: Wash skin immediately with soap and warm water. Get medical attention if irritation persists.

FIRST AID FOR INHALATION: If a person is overcome by excessive exposures to dusts or aerosols 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. Drink one or two glasses of water and induce vomiting by touching back of throat with finger, or, if available, by administering syrup of ipecac. If syrup of ipecac is available, administer 1 tablespoonful (15 mL) of syrup of ipecac followed by 1 to 2 glasses of water. If vomiting does not occur within 20 minutes, repeat the dose once. Do not induce vomiting or give anything by mouth to an unconscious person.

FIRST AID MEASURES continued:

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 paresthesia caused by synthetic pyrethroids. In case of overexposure, it is also requested that Bayer Corp., Agriculture Division, Kansas City, Missouri, be notified. Telephone: 1-800-414-0244

5. FIRE FIGHTING MEASURES:

FLASH POINT: 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/60 day average not to exceed 120 °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 of TEMPO 20 WP through the use of general and local exhaust ventilation where needed.

RESPIRATOR REQUIREMENTS: When needed based on the conditions of use, wear a NIOSH-approved organic vapor respirator with particulate pre-filter.

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.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM:	Solid; 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:	20-26 lb/cu-ft
VAPOR PRESSURE:	3.3 x 10 -8 mm Hg @ 20 °C (for cyfluthrin)

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

11. TOXICOLOGICAL INFORMATION:

Only acute studies have been performed on this product as formulated. The non-acute information pertains to the active ingredient, cyfluthrin.

ACUTE TOXICITY:

ORAL LD50: Male Rat: 3084 mg/kg -- Female Rat: 1733 mg/kg

DERMAL LD50: Male and Female Rabbit: >2000 mg/kg

INHALATION LC50: 4 hr exposure to Dust: Male and Female Rat: >1.18 mg/l (analytical) -- 1 hr exposure to Dust (extrapolated from 4 hr LC50): Male and Female Rat: >4.72 mg/l (analytical)

EYE EFFECTS: Rabbit: Mild irritation to the iris and conjunctiva was observed with all irritation resolving within 7 days.

SKIN EFFECTS: Rabbit: Slight dermal irritant.

SENSITIZATION: Guinea Pig: Not a dermal sensitizer.

SUBCHRONIC TOXICITY:

In a 3 week dermal toxicity study, cyfluthrin 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 treatment 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 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 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.

TOXICOLOGICAL INFORMATION continued:

MUTAGENICITY:

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

DEVELOPMENTAL TOXICITY:

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:

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. 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:

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. 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 th 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. Clinical symptoms were observed imediately 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 material is toxic to fish and highly toxic to bees when exposed to direct treatment or residues. 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 1-800-414-0244.

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:	Not Noted
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

SECTION 313 TOXIC CHEMICALS: Cyfluthrin-CAS# 68359-37-5 (20%)

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) The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME /CAS NUMBER	**CONCENTRATION**	**STATE CODE**
Total crystalline silica (quartz)		
14808-60-7	<1 - 7 %	CA

CA = California Proposition 65

An evaluation of TEMPO 20 WP indicates potential exposure to respirable crystalline silica during normal use poses no significant risk and therefore does not trigger warning requirements as specified under California Proposition 65.

16. OTHER INFORMATION:

NFPA 704M RATINGS:

Health: 2	Flammability: 1	Reactivity: 1	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 as a customer service.

REASON FOR ISSUE: Revise Sections 3 (carcinogenicity & IARC statements); 8 (respirator requirements); 11 (update subchronic, chronic, carcinogenicity, reproduction, & neurotoxicity data); 15 (add state regulatory information); revise to ANSI format

PREPARED BY: V. C. Standart

APPROVED BY: D. C. Eberhart

TITLE: Product Safety Manager

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MSDS NUMBER: 08265