Bayer CropScience

MATERIAL SAFETY DATA SHEET

BAYER CROPSCIENCE LP
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2 T.W. Alexander Drive
Research Triangle Park, NC 27709

For Medical and Transportation Emergencies Only:
Call 24 hours a day 1-800-334-7577
For Product Use Information: Call 1-866-99BAYER (1-866-992-2937)

1. CHEMICAL PRODUCT IDENTIFICATION:

PRODUCT NAME.....: LEVERAGE 2.7 Suspension Emulsion Insecticide
PRODUCT CODE.....: 11676
CHEMICAL FAMILY.....: Chloronicotinyl (imidacloprid); pyrethroid (cyfluthrin)
CHEMICAL NAME.....:
1-((6-Chloro-3-pyridinyl)methyl)-N-nitro-2-imidazolidinimine; Cyano(4-fluoro-3-phenoxyphenyl)methyl 3-(2,2-dichloroethenyl)-2,2-dimethylcyclopropanecarboxylate
SYNONYMS.....: Imidacloprid, Cyfluthrin
FORMULA.....: C22 H18 Cl2 F N 03 (cyfluthrin); C9 H10 Cl N5 02 (imidacloprid)
PRODUCT USE.....: Commercial Insecticide
EPA Registration No.: 264-770

2. COMPOSITION/INFORMATION ON INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
***** HAZARDOUS INGREDIENTS *****		
Cyfluthrin 68359-37-5	OSHA : Not Established ACGIH: Not Established	12 %
Imidacloprid 138261-41-3	OSHA : Not Established ACGIH: Not Established	17 %
Naphthalene Specific chemical identity is withheld as a trade secret.	OSHA : 10.00 ppm TWA ACGIH: 10.00 ppm TWA 15.00 ppm STEL	1-2 %

2. COMPOSITION/INFORMATION ON INGREDIENTS (Continued)

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
Ingredient 1510 Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	10-15 %
Ingredient 2420 Specific chemical identity is withheld as a trade secret.	OSHA : Not Established ACGIH: Not Established	1-3 %

3. HAZARDS IDENTIFICATION:

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* EMERGENCY OVERVIEW *
*
* WARNING! Color: White to beige; Form: Viscous Liquid; *
* Odor: Not established; Causes skin irritation; May cause *
* allergic skin reaction; Causes eye irritation; May be fatal *
* 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.....: Moderate eye irritation and severe dermal irritation may occur from contact with this product. 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 during 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 death. Based on EPA Toxicity Category Criteria, this product is moderately toxic by the oral route of exposure and essentially non-toxic by the dermal route of exposure. In addition, animal studies have shown that this product is a positive dermal sensitizer.

CHRONIC EFFECTS OF EXPOSURE...: Based on animal studies, no adverse effects are expected from chronic exposure to the active ingredients in this product. 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 ingredients 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.

4. FIRST AID MEASURES:

FIRST AID FOR EYES.....: Hold eyelids open and flush with plenty of water for 15 minutes. Call a physician if irritation persists or develops after flushing.

FIRST AID FOR SKIN.....: Remove contaminated clothing. Wash skin with soap and water. Get medical attention if irritation develops or persists.

FIRST AID FOR INHALATION: If a person is overcome by excessive exposures to 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.

NOTE TO PHYSICIAN.....: Treat the patient symptomatically. Published data indicate vitamin E acetate can prevent and/or mitigate symptoms of paraesthesia caused by synthetic pyrethroids. It is also requested that Bayer CropScience be notified. Call the emergency number on page 1.

5. FIRE FIGHTING MEASURES:

FLASH POINT.....: Greater than 200 F (93 C)

EXTINGUISHING MEDIA.....: Foam; Dry Chemical

5. FIRE FIGHTING MEASURES (Continued)

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.

6. ACCIDENTAL RELEASE MEASURES:

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.

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE(MIN/MAX): None/30 day avg. not to exceed 100 F (38 C)
SHELF LIFE.....: Time/temperature-dependent. Specific information available upon request.
SPECIAL SENSITIVITY.....: Not established
HANDLING/STORAGE PRECAUTIONS: Store in a cool, dry area designated for pesticides. Do not allow product to contaminate material which is intended for use or consumption by humans or animals.

8. PERSONAL PROTECTION:

EYE PROTECTION REQUIREMENTS.....: Splash-proof goggles
SKIN PROTECTION REQUIREMENTS.....: Long sleeves and trousers
HAND PROTECTION REQUIREMENTS.....: Chemical-resistant gloves such as barrier laminate
VENTILATION REQUIREMENTS.....: Control exposure levels through the use of general and local exhaust ventilation.
RESPIRATOR REQUIREMENTS.....: If 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 separately after use. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM.....: Viscous Liquid
COLOR.....: White to beige
ODOR.....: Not established
MOLECULAR WEIGHT.....: 255.7 (for imidacloprid); 434.3 (for cyfluthrin)
pH .....: 6
BOILING POINT.....: Not established
MELTING/FREEZING POINT....: 14 F
VISCOSITY.....: 600 cps @ 23 C
SOLUBILITY IN WATER .....: Not established
SPECIFIC GRAVITY .....: 1.1 @ 20 C/20 C
BULK DENSITY.....: Not applicable
VAPOR PRESSURE .....: 1.5 x 10-9 mm Hg @ 20 C (for imidacloprid); 7.2 x 10-9 mm Hg @ 20 C (for cyfluthrin)

10. STABILITY AND REACTIVITY:

STABILITY.....: This is a stable material.
HAZARDOUS POLYMERIZATION...: Will not occur.
INCOMPATIBILITIES.....: Alkaline media
INSTABILITY CONDITIONS.....: None known
DECOMPOSITION PRODUCTS.....: None known

11. TOXICOLOGICAL INFORMATION:

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

ACUTE TOXICITY
ORAL LD50.....: Male and Female Rat: 200 mg/kg
DERMAL LD50.....: Male and Female Rat: >5000 mg/kg
INHALATION LC50....: 4 Hr. Exposure to Liquid Aerosol: Male and Female Rat: >2.502 mg/L (analytical); 1 Hr. Exposure to Liquid Aerosol (extrapolated from 4 Hr. LC50): Male and Female Rat: >10 mg/L (analytical)

11. TOXICOLOGICAL INFORMATION (Continued)

EYE EFFECTS.....: Rabbit: Moderate irritation to the cornea, iris and conjunctiva was observed with all remarkable irritation clearing within 96 hours post-treatment.

SKIN EFFECTS.....: Rabbit: Severe dermal irritant.

SENSITIZATION.....: Guinea pig: Positive dermal sensitizer.

SUBCHRONIC TOXICITY...: In a 3 week dermal toxicity study, rabbits were treated with the active ingredient, imidacloprid, at the limit dose level of 1000 mg/kg for 6 hours/day, 5 days/week. There were no local or systemic effects observed of the levels tested. The no-observed-effect-level (NOEL) was 1000 mg/kg. In a 4 week inhalation study, rats were exposed to dust concentrations of imidacloprid at 5.5, 30.5 and 191.2 mg/m3 for 6 hours/day, 5 days/week. Effects observed at the high concentration included decreased body weight gains, decreased heart and thymus weights, increased liver weights, and induction of the hepatic mixed-function oxidases. Histopathological examinations did not reveal any organ damage or local injury to the respiratory tract. The NOEL was 5.5 mg/m3 based on induction of the hepatic mixed-function oxidases. 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.....: Dogs were administred imidacloprid for 1 year at dietary concentrations of 200, 500 or 1250 ppm. Due to lack of significant effects, the high dose was increased to 2500 ppm at 17 weeks for the remainder of the study. Effects observed at the high dose included decreased food consumption, increased liver weights and elevated serum chemistries. The NOEL was 500 ppm. In chronic studies using rats, imidacloprid was administered for 2 years at dietary concentrations of 100, 300, 900 or 1800 ppm. Histopathology examinations revealed an increased incidence of mineralization in the colloid of the thyroid follicles at concentrations of 300 ppm and greater. At 1800 ppm, there were changes in serum chemistries and a slight increase in the incidence of parafollicular hyperplasia seen in the thyroids. Body weight gains were reduced at 900 and 1800 ppm. The overall NOEL was 100 ppm. 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 ppm and greater. The NOEL was 100 ppm.

CARCINOGENICITY.....: Imidacloprid was investigated for carcinogenicity in chronic feeding studies using mice and rats at maximum levels of 2000 and 1800 ppm, respectively. There was no evidence of a carcinogenic potential observed in either species. 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.....: The imidacloprid mutagenicity studies, taken collectively, demonstrate that the active ingredient is not genotoxic or mutagenic. Numerous in vitro and in vivo mutagenicity studies have been conducted on cyfluthrin, all of which are negative.

DEVELOPMENTAL TOXICITY: In a developmental toxicity study using rats, imidacloprid was administered by oral gavage during gestation at doses of 10, 30 or 100 mg/kg. At the maternally toxic dose of 100 mg/kg, skeletal examinations of the fetuses revealed a slight increase in the incidence of wavy ribs. The NOELs for maternal and developmental toxicity were 10 and 30 mg/kg, respectively. Teratogenic effects were not observed at any of the doses tested. Rabbits were administered imidacloprid during gestation at oral doses of 8, 24 or 72 mg/kg. At the maternally toxic dose of 72 mg/kg, reduced body weights and delayed skeletal ossification were observed in the fetuses. The NOELs for maternal and developmental toxicity were 8 and 24 mg/kg, respectively. Teratogenic effects were not observed at any of the doses tested. 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, imidacloprid was administered to rats for 2 generations at dietary concentrations of 100, 250 or 700 ppm. Offspring at 700 ppm, exhibited reduced mean body weights and body weight gains. No other reproductive effects were observed. The maternal and reproductive NOELs were 100 and 250 ppm, respectively. 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 .....: In an acute neurotoxicity screening study using rats, imidacloprid was administered as a single oral dose at levels of 42, 151, or 307 mg/kg. Clinical observations and neurotoxicity evaluations were performed over a period of 15 days followed by a neurohistopathological examination. Deaths attributed to imidacloprid were observed at the high dose within a day of treatment. The NOEL for motor and locomotor activity was 42 mg/kg for males. Females at the low dose exhibited minimal decrease in activity in the figure-eight maze. In a subsequent study, the NOEL for motor and locomotor activity in females was 20 mg/kg. All clinical signs and neurobehavioral effects were ascribed to acute cholinergic toxicity, with complete recovery at sub-lethal doses within 7 days following treatment. The NOEL for neurotoxicity was 307 mg/kg based on the absence of treatment-related microscopic lesions in skeletal muscle or neural tissue. In a 13 week neurotoxicity screening study, imidacloprid was administered to rats at dietary concentrations of 140, 963 or 3027 ppm. At the mid- and high-dose, effects observed included reductions in body weight and feed consumption, and clinical chemistry findings. Neurobehavioral changes were observed only in males at the high dose. There were no correlative micropathologic findings in muscle or neural tissues in any animals at any treatment level. The NOEL for neurotoxicity was 3027 ppm. The overall NOEL was 140 ppm. 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 the offspring at 4 months of age (approximately 3.5 months post-exposure). At 50 mg/m3, all of the offsprings 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 immediately 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 highly toxic to aquatic invertebrates, fish and bees. Bayer CropScience will provde 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 emergency number on page 1.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD.....: Follow container label instructions for disposal of wastes generated during use in compliance with the FIFRA product label. In other situations, bury in an EPA-approved landfill or burn in an incinerator approved for pesticide destruction. Do not reuse container.

14. TRANSPORTATION INFORMATION:

TECHNICAL SHIPPING NAME.....: Cyfluthrin and Imidacloprid
FREIGHT CLASS BULK.....: Insecticides, NOI - NMFC 102100
FREIGHT CLASS PACKAGE.....: Insecticides, NOI - NMFC 102100
PRODUCT LABEL.....: Not Noted

DOT (DOMESTIC SURFACE)

PROPER SHIPPING NAME.....: Pesticides, Liquid, Toxic, N.O.S.
HAZARD CLASS OR DIVISION .....: 6.1
UN/NA NUMBER.....: UN2902
PACKING GROUP .....: III
DOT PRODUCT RQ lbs (kgs).....: None
HAZARD LABEL(s).....: Toxic
HAZARD PLACARD(s).....: Toxic

IMO / IMDG CODE (OCEAN)

PROPER SHIPPING NAME.....: Pesticides, Liquid, Toxic, N.O.S.
HAZARD CLASS DIVISION NUMBER...: 6.1
UN NUMBER.....: UN2902
PACKAGING GROUP.....: III
HAZARD LABEL(s).....: Toxic
HAZARD PLACARD(s).....: Toxic

14. TRANSPORTATION INFORMATION (Continued)

IMO / IMDG CODE (continued)

ICAO / IATA (AIR)

PROPER SHIPPING NAME.....: Pesticides, Liquid, Toxic, N.O.S.
HAZARD CLASS DIVISION NUMBER...: 6.1
UN NUMBER.....: UN2902
SUBSIDIARY RISK.....: None
PACKING GROUP.....: III
HAZARD LABEL(s).....: Toxic
RADIOACTIVE?.....: Non-Radioactive
PASSENGER AIR - MAX. QTY. .....: 60 Liters
PASSENGER PACKING INSTRUCTION..: 611
CARGO AIR - MAX. QTY. .....: 220 Liters
CARGO AIR PACKING INSTRUCTION..: 618

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..: None
SARA TITLE III:
SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES..: None
SECTION 311/312 HAZARD CATEGORIES.....: Immediate Health Hazard; Delayed Health Hazard
SECTION 313 TOXIC CHEMICALS.....: Cyfluthrin - 12% (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		

16. OTHER INFORMATION (Continued)

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

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

REASON FOR ISSUE.....: Revise address,telephone number,new EPA Req. No., Sections 4,12 and 16
PREPARED BY.....: C. A. Sheehan
APPROVED BY.....: S. E. Earnest
TITLE.....: Managaer, Quality Systems Services
APPROVAL DATE.....: 03/04/2003
SUPERSEDES DATE.....: 09/26/2001
MSDS NUMBER.....: 34789