Nichino America, Inc.
Applaud® 70DF

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name: Applaud® 70DF

General Use: Insect control in food crops

Product Description: Tan granule

EPA Registration Number: 71711-21

MSDS Identification Code/Number: 014

Manufacturer Main Headquarter: Nihon Nohyaku Co., Ltd., 1-2-5, Nihonbashi, Chuo-ku, Tokyo 103, JAPAN
Non-emergency information:
Phone: 81-3-3278-0461
Facsimile: 81-3-3281-2443
Emergency information:
Phone: 81-3-3281-1887

US Connection: Nichino America, Inc., 4550 New Linden Hill Road, Suite 501, Wilmington, Delaware 19808, USA
Phone: 302-636-9001
Facsimile: 302-636-9122

Emergency and Health and Safety Inquiries: 800-348-5832 (24 hours).
In case of fire or spills, information may be obtained by calling 800-424-9300.
In case of international shipments, call 703-527-3887.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Single or Mixed Product: Mixed

Common Name: buprofezin

Chemical Name: (IUPAC) 2-*tert*-butylimino-3-isopropyl-5-phenylperhydro-1,3,5-thiadiazin-4 one

2-[(1, 1-dimethylethyl)imino]tetrahydro-3-(1-methylethyl)- 5-phenyl-4H-1,3,5-thiadiazin-4-one (CA)

Chemical Formula: $C_{16}H_{23}N_3OS$

Ingredients and Composition:

Component	CAS Number	Percent
Buprofezin Technical	69327-76-0	70%
Other ingredients		29%
hydrated amorphous fumed silica	7631-86-9	1%

3. HAZARDS IDENTIFICATION

Emergency Overview-Caution:

- Harmful if swallowed, inhaled, or absorbed through the skin.
- Causes moderate eye irritation.
- Product is a tan granule.

Routes of Exposure:

- Dust inhalation
- Skin contact

Signs and Symptoms of Overexposure:

Symptoms from excessive ingestion of Buprofezin Technical may include subdued mood, slight muscular incoordination, and a slightly enlarged abdomen.

Potential Health Effects:

Eye Contact: Contact with this product causes moderate eye irritation.

Ingestion: No specific health effects are known for ingestion of a small amount incidental to routine handling and use. Ingestion of large amounts may be harmful (See "Signs and Symptoms of Overexposure" above).

Inhalation: Inhalation of this product is harmful. The active ingredient (Buprofezin Technical) is not known to be a significant irritant to the respiratory system, but excessive dust inhalation of the inert ingredients in a confined area may cause irritation and congestion of the upper respiratory tract.

Skin Contact: Absorption through the skin is harmful. This product is a slight skin irritant but not a skin sensitizer.

Delayed/Long- Term Effects:

Carcinogenic: None of the product ingredients are listed as carcinogenic by NTP, IARC, or OSHA.

Medical Conditions Aggravated by Exposure:

Excessive dust inhalation may aggravate pre-existing respiratory conditions.

4. FIRST-AID MEASURES

Eye Contact: Flush eyes with plenty of water. Call a physician if irritation persists.

Ingestion: Call a physician or the Poison Control Center. Drink one or two glasses of water. Induce vomiting by touching the back of the throat with the finger, or if available, by administering syrup of ipecac. If the person is unconscious, do not give anything by mouth and do not induce vomiting.

Inhalation: Remove the victim to fresh air. If not breathing, give the victim artificial respiration, preferably mouth-to-mouth. Get medical attention.

Skin Contact: Wash with plenty of soap and water. Get medical attention if irritation persists.

Hints for the Physician: Provide supportive care and symptomatic treatment (eye/respiratory irritation).

For additional information, call Emergency and Health and Safety Inquiries 800-348-5832 (24 hours).

5. FIRE-FIGHTING MEASURES

Extinguishing Media: Alcohol-resistant foam, carbon dioxide, dry chemicals, and water spray.

Special Fire-Fighting Procedure: Firemen should wear positive-pressure, self-contained breathing apparatus.

Flammable Properties: Flash point: Does not flash.

Auto Ignition Temperature: Not combustible.

Hazardous Decomposition Products: Carbon dioxide, carbon monoxide, nitrogen oxides, and sulfur dioxide.

6. ACCIDENTAL RELEASE MEASURES

General and Disposal: Take all necessary actions to prevent and remedy the adverse effects of the spill. Ensure that disposal is in compliance with federal requirements and local disposal regulations. Notify the appropriate authorities immediately.

Land Spill and Leak: Do not breathe the dust. Use a suitable dust respirator. Avoid contact with skin and eyes. Carefully sweep up the spilled product, avoiding formation of a dust cloud, and place it in a suitable container. Seal the container. The area can be washed with water to remove the last traces of the product, but keep out of watercourses or sewers. Inform authorities immediately if contamination occurs.

7. HANDLING AND STORAGE

Handling:

Caution: This product is harmful if swallowed, inhaled, or absorbed through the skin. It causes moderate eye irritation. Avoid contact with skin, eyes, or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing, and wash them before reuse.

Users Should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Follow the manufacturer's instructions for cleaning and maintaining personal protective equipment (PPE). If no such instructions are provided for washables, use detergent and hot water. Keep PPE separate from other laundry; wash it separately.
- Do not apply this product in a way that will contact workers or other persons, either directly or through drift.
- Do not apply this product through any type of irrigation system. .Allow only protected handlers in the area during application.
- For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

Storage: Store in a cool, dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

Control airborne contaminants below the exposure guidelines (see below for any applicable OSHAIACGIH exposure limits). Use with adequate ventilation to minimize exposure. Local exhaust ventilation may be necessary, especially when the product is used in a confined area.

Personal Protective Equipment (PPE):

Applicators and Handlers of Agricultural Products

All users of agricultural products that are within the scope of the EPA Worker Protection Standards (WPS) (40 CFR Part 170) must refer to the statements below or the product label for WPS-specified PPE, restricted entry interval (REI), and other precautionary statements.

PPE for Applicators and Handlers:

Applicators and handlers must wear

- Long-sleeved shirts and long pants
- Waterproof gloves
- Shoes plus socks

PPE Required for Early Entry into Treated Areas:
If working with plants, soil, or water in treated areas during the REI of 12 hours, personnel must wear

- Coveralls over long-sleeved shirts and long pants.
- Waterproof gloves
- Socks and chemical-resistant footwear

Manufacturing and Packaging Personnel

Manufacturing and packaging personnel should use this product in well-ventilated areas. In accordance with recommended OSHA standards, they should wear

- Impervious gloves (PVC or rubber), especially when prolonged or repeated contact is anticipated
- Safety glasses or chemical goggles
- Approved dust respirators, especially when handling the product in a confined space.

Exposure Guidelines:

	Exposure Limit		
Ingredient	OSHA PEL	ACGIH TLV	HCC WEL
hydrated amorphous fumed silica	—	10 mg/m^3 (TWA)	—
	—		—

— No exposure limit established

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Tan granule
Physical State: Solid
Melting Point: 219-221°f or 104.2-105.5°C*
Solubility (H_20): 0.382 mg/l (very slight) @ 25°C*
Bulk Density: 15.6 lb/cu. Ft.
Vapor Pressure: 9.4 x 10 (-6) mmHg (20°C, 68°F)*

* The data cited were for the active ingredient (buprofezin technical),

10. STABILITY AND REACTIVITY

Chemical Stability: This product is stable. The active ingredient is stable under dark and cool storage conditions; it is also stable in acid and alkali.

Thermal Stability: 130°C (266°F), maximum for buprofezin technical.
Incompatibility With Other Materials: None known.
Hazardous Decomposition Products: May decompose at extreme high temperatures to form oxides of carbon, nitrogen, and sulfur.
Hazardous Polymerization: None known.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:

Oral:	Rat LD_{50}	>5,000 (slightly toxic)
Dermal:	Rat LD_{50}	>2,000 mg/kg (moderately toxic)
Inhalation:	Rat LC_{50}	>2.2 mg/l (4 hrs)
Eye Irritation:	—	Causes moderate eye irritation
Skin Irritation:	Rabbit:	Slightly irritating (PII = 1.146)
Skin Sensitization:	Guinea Pig:	Not a sensitizer

Subchronic (Target Organ Effects):

Buprofezin Technical was shown to have no target organ effects (NOEL) in the 90-day animal studies at dietary levels up to the tested mid-dose: 50 mg/kg per day in dogs and approximately 18 mg/kg/day in rats. At the extreme experimental doses (300 mg/kg/day in dogs and approximately 95 mg/kg/day in rats), effects of enlarged livers were observed in animals after prolonged feeding. Enlarged thyroid was also seen in rats at dose levels >95 mg/kg/day (> 1000 ppm).

Chronic (Cancer Information):

In 2-year feeding studies with Buprofezin Technical, the no-effect levels (NOEL) in the three tested animals were all at a similar dose of approximately 2 mg/kg/day (dogs: 2 mg/kg/day; rats/mice: 20 ppm = 1.8/0.9 mg/kg/day). At the high doses of 200 mg/kg/day or greater, toxic chronic effects of Buprofezin Technical were seen in all tested dogs, rats, and mice. These include increased liver weights (all species), increased thyroid weights (dogs, rats), elevated incidences of hyperplasia or hypertrophy ofhepatocytes (rats, mice), and hyperplasia of thyroid epithelial cells (only in rats). However, no treatment-related increases in tumor incidences in livers or thyroids were reported for all three animal species tested in these 2-year feeding studies.

Carcinogenicity:

NTP:	No
IARC:	No
OSHA:	No

Teratogenicity (Birth Defects):

Pregnant rats in a teratology study were administered orally with three dose levels of Buprofezin Technical (50,200, and 800 mg/kg/day) from Day 6 to Day 15 during the 20-day gestation period. No teratogenic effects ofbuprofezin were observed in pregnant rats at dose levels up to 200 mg/kg/day (NOEL). At the highest test dose of 800 mg/kg/day, Buprofezin Technical exhibited significant effects on the maternal performance (increased litter resorption, post implantation loss, and reduced litter size) and on the fetal growth/development.

In a separate rabbit teratology study, Buprofezin Technical (10,50, or 250 mg/kg/day) showed no significant adverse effects on fetal development and fetal survival in utero even at the highest test dose; the effects observed at the 250 mg/kg/day were on the maternal toxicity (reduced food intake and weight loss). The no-effect level (NOEL) of Buprofezin Technical in rabbits was 50 mg/kg/day.

Reproductive Effects:

In two multigeneration reproduction studies in rats administered with the three tested dose levels (10, 100, and 1000 ppm), Buprofezin Technical had no adverse effects on the reproductive performances of the parental rats (fertility/pregnancy), the survival and growth/development of the pups in each generation, and the female parturition status (labor/delivery process). The only effects observed were a decrease in body weight gain of pups from the 1000 ppm group.

Mutagenicity (Genetic Effects):

Buprofezin Technical is not mutagenic or genotoxic when tested in Arnes's Salmonella gene mutation assay and in two other in vitro mutagenesis systems (mouse lymphoma cells and primary rat hepatocytes). Buprofezin Technical was also not mutagenic when tested in an in vivo system, since it did not induce micronuclei formations in bone marrow erythrocytes from mice administered with extreme experimental doses (6,400-10,000 mg/kg/day).

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12. ECOLOGICAL INFORMATION

Environmental Toxicity:

Based on the available information, the acute toxicity of buprofezin to mammals is low. It is considered non-toxic to avian species and to aquatic species at its limit of solubility in water (acute studies). Buprofezin has no apparent effect on parasitic wasps in the genera Paracentrobia, Anagrus, and Microterys, or the predatious mites Phytoseilulus persimilis and Ambylseius longispinosus.

Environmental Hazards:

For terrestrial uses, do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water through disposal of equipment washwaters.

13. DISPOSAL CONSIDERATION

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on-site or at an approved waste disposal facility.

Container Disposal: Completely empty container into application equipment. Then dispose of empty packaging in a sanitary landfill, or by incineration, or, if allowed by State or local authorities, by burning. If burned, stay out of smoke.

14. TRANSPORT INFORMATION

Proper Shipping Name: None

DOT Shipping Label: None

Note: For transportation purposes (49 CFR Part 173.132), the calculated inhalation LC_{50} (rat, 1 hour) is >8.8 mg/liter. Based on this and other package properties of the product, Applaud® 70DF is rated as practically nontoxic for transport purposes.

15. REGULATORY INFORMATION

State Regulations: The following chemicals associated with the product are subject to the right-to-know regulations in the specified states:

hydrated amorphous fumed silica (7631-86-9): Massachusetts

U.S. Federal Regulations: SARA Title III Notification and Information
SARA Title III – Hazard Classes

Acute Health Hazard:	Yes
Chronic Health Hazard:	No
Fire Hazard:	No
Sudden Release of Pressure Hazard:	No
Reactivity Hazard:	No

TSCA Inventory Status
The following components are not listed:

Buprofezin Technical (69327-76-0) 70%

Inert ingredients 29% as well as:
hydrated amorphous fumed silica 7631-86-9 1%

SARA 313: No components listed

16. OTHER INFORMATION

Hazard Ratings:	Health	Flamm	React	Other
NFPA	1	1	0	0
HMIS	1	0	1	E

MSDS Identification Code/ Number: 014
Prepared By: Dept. of Regulatory Affairs **Phone:** (302) 636-9001
Date: September 16, 2004
Supercedes MSDS dated: September 12, 2003
MSDS Revision (R2): Revisions in ingredients and compostion, exposure guidelines, and regulatory information; add EPA registration number.

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This information is provided in good faith but without express or implied warranty.