SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : Chlorothalonil
Catalog Number : io-1991
CAS Number : 1897-45-6
Identified uses : Laboratory chemicals, manufacture of chemical compounds
Company : Ionz

>> R&D Use only

2. Hazards Identification

GHS Classification:

Flammable liquid (category 2)
Acute toxicity, oral (Category 3)
Acute toxicity, dermal (Category 3)
Acute toxicity, inhalation (Category 3)
Specific target organ toxicity, single exposure (Category 1)

Pictogram(s)

GHS Hazard Statements

>> H317 (100%): May cause an allergic skin reaction [Warning Sensitization, Skin]

>> H318 (100%): Causes serious eye damage [Danger Serious eye damage/eye irritation]

>> H330 (97.3%): Fatal if inhaled [Danger Acute toxicity, inhalation]

>> H335 (96.4%): May cause respiratory irritation [Warning Specific target organ toxicity, single exposure; Respiratory tract irritation]

>> H351 (97.3%): Suspected of causing cancer [Warning Carcinogenicity]

>> H400 (96.7%): Very toxic to aquatic life [Warning Hazardous to the aquatic environment, acute hazard]

>> H410 (100%): Very toxic to aquatic life with long lasting effects [Warning Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P203, P260, P261, P264+P265, P271, P272, P273, P280, P284, P302+P352, P304+P340, P305+P354+P338, P316, P317, P318, P319, P320, P321, P333+P317, P362+P364, P391, P403+P233, P405, and P501

Health Hazards:

>> SYMPTOMS: Symptoms of exposure to this compound include dermatitis and gastrointestinal, skin and upper respiratory tract irritation.

>> ACUTE/CHRONIC HAZARDS: This compound is a positive animal carcinogen. When heated to decomposition it emits toxic fumes of chloride ion, NOx and cyanide ion. (NTP, 1992)

>> Literature sources indicate that this compound is nonflammable. (NTP, 1992)

>> Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire. Risk of fire and explosion if formulations contain flammable/explosive solvents.

3. Composition/Information On Ingredients

Chemical name : Chlorothalonil
CAS Number : 1897-45-6
Molecular Formula : C8Cl4N2
Molecular Weight : 265.9000 g/mol

4. First Aid Measures

First Aid:

>> EYES: First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center. Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician. IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

>> SKIN: IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water. If symptoms such as redness or irritation develop, IMMEDIATELY call a physician and be prepared to transport the victim to a hospital for treatment.

>> INHALATION: IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. IMMEDIATELY call a physician and be prepared to transport the victim to a hospital even if no symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.

>> INGESTION: DO NOT INDUCE VOMITING. If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call a hospital or poison control center. Be prepared to transport the victim to a hospital if advised by a physician. If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. IMMEDIATELY transport the victim to a hospital.

>> OTHER: Since this chemical is a known or suspected carcinogen you should contact a physician for advice regarding the possible long term health effects and potential recommendation for medical monitoring. Recommendations from the physician will depend upon the specific compound, its chemical, physical and toxicity properties, the exposure level, length of exposure, and the route of exposure. (NTP, 1992)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest.

Skin First Aid

>> Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention .

Eye First Aid

>> Rinse with plenty of water (remove contact lenses if easily possible). Refer immediately for medical attention.

Ingestion First Aid

>> Rinse mouth. Refer for medical attention .

5. Fire Fighting Measures

>> Fires involving this compound should be controlled with a dry chemical, carbon dioxide or Halon extinguisher. (NTP, 1992)

>> Use water spray, foam, powder, carbon dioxide.

6. Accidental Release Measures

Isolation and Evacuation:

Isolation and evacuation measures to take when a large amount of this chemical is accidentally released in an emergency.

>> Excerpt from ERG Guide 151 [Substances - Toxic (Non-Combustible)]:

>> IMMEDIATE PRECAUTIONARY MEASURE: Isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.

>> SPILL: See ERG Table 1 - Initial Isolation and Protective Action Distances on the UN/NA 3276 datasheet.

>> FIRE: If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2024)

Spillage Disposal:

Methods for containment and safety measures to protect workers dealing with a spillage of this chemical.

>> Personal protection: chemical protection suit and protective gloves. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

7. Handling And Storage

Safe Storage:

>> Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs. Store in an area without drain or sewer access.

Storage Conditions:

>> Keep in cool, dry, ventilated place.

8. Exposure Control/ Personal Protection

Inhalation Risk:

>> A harmful concentration of airborne particles can be reached quickly when dispersed.

Effects of Short Term Exposure:

>> The substance is severely irritating to the eyes. The substance is irritating to the respiratory tract. The substance is mildly irritating to the skin.

Effects of Long Term Exposure:

>> Repeated or prolonged contact with skin may cause dermatitis. Repeated or prolonged contact may cause skin sensitization.

Acceptable Daily Intakes:

An estimate of the amount of a chemical in food or drinking water that can be consumed daily over a lifetime without presenting an appreciable risk to health. It is usually expressed as milligrams of the substance per kilogram of body weight per day and applies to chemicals such as food additives, pesticide residues and veterinary drugs.

>> OPP RfD= 0.015 mg/kg; EPA RfD= 0.015 mg/kg

Exposure Prevention

>> AVOID ALL CONTACT!

Inhalation Prevention

>> Use local exhaust or breathing protection.

Skin Prevention

>> Protective gloves. Protective clothing.

Eye Prevention

>> Wear safety spectacles or eye protection in combination with breathing protection if powder.

Ingestion Prevention

>> Do not eat, drink, or smoke during work. Wash hands before eating.

9. Physical And Chemical Properties

Molecular Weight:

>> 265.9

Exact Mass:

>> 265.878609

Physical Description:

>> Chlorothalonil appears as colorless crystals or granules or light gray powder. Melting point 250-251 °C. No odor when pure; technical grade has a slightly pungent odor. A fungicide formulated as water-dispersible granules, wettable powder, or dust.

>> ODOURLESS COLOURLESS CRYSTALS.

Color/Form:

>> Colorless crystals

Odor:

>> Odorless in pure form

Boiling Point:

>> 662 °F at 760 mmHg (NTP, 1992)

>> 350 °C

Melting Point:

>> 482 to 484 °F (NTP, 1992)

>> 250-251 °C

Solubility:

>> less than 0.1 mg/mL at 70 °F (NTP, 1992)

>> Solubility in water, g/100ml at 25 °C:

Density:

>> 1.7 at 77 °F (NTP, 1992) - Denser than water; will sink

>> Relative density (water = 1): 1.8

Vapor Pressure:

>> less than 0.01 mmHg at 104 °F ; 9.2 mmHg at 338.7 °F (NTP, 1992)

>> Vapor pressure, Pa at 40 °C:

LogP:

>> log Kow = 3.05

>> 3.05

Stability/Shelf Life:

>> Thermally stable at ambient temperatures. Stable to u.v. light in aqueous media and in crystalline state. Stable in acidic and moderately alkaline aqueous solutions; slow hydrolysis at pH >9.

Decomposition:

>> May decompose at high temp to emit hydrogen chloride.

Corrosivity:

The ability of a chemical to damage or destroy other substances when it comes into contact.

>> Non-corrosive

10. Stability And Reactivity

>> Insoluble in water.

11. Toxicological Information

Toxicity Summary:

>> IDENTIFICATION AND USE: Chlorothalonil forms colorless and odorless crystals in pure form. It is a substituted benzene fungicide used to control fungal diseases in vegetables, fruit, turf, and ornamental plants. Chlorothalonil is registered for use in the U.S., but approved pesticide uses may change periodically and so federal, state and local authorities must be consulted for currently approved uses. HUMAN EXPOSURE AND TOXICITY: Contact dermatitis was observed in a number of employees in a chlorothalonil manufacturing plant. There were 19 cases out of 103 employees. About 60% of the employees showed some kind of skin abnormality compared with 18.5% of employees not working with chlorothalonil. When the hygiene conditions of the plant were improved the overall proportion of skin abnormalities fell to about 20% and there were no cases of chlorothalonil contact dermatitis. One report concerned a Danish cabinet maker who developed dermatitis on his hands after 9 months of painting furniture with wood preservatives containing chlorothalonil. Another report referred to three cases: two with erythema on the face, particularly periorbitally, and one with eczema of the hands, in people engaged in similar work. Patients showed a positive reaction to patch tests with 0.01% chlorothalonil in acetone. Ocular exposures to chlorothalonil from employees at a packaging plant involved intense pain with mild to moderate conjunctivitis and irritation of the corneal surface. Ocular edema was also seen in more extensive exposures. With lesser exposures, complete recovery occurred within 24 hr. Recovery took slightly longer following extensive exposure. In no instance was corneal opacity observed. ANIMAL STUDIES: Instillation of chlorothalonil (96%) to rabbit eyes resulted in severe irritation with persistent corneal opacity, iris effects, and conjunctival irritation. In a carcinogenicity study in rats, chlorothalonil (98.1%) was administered in the diet up to 175 mg/kg/day for 116 weeks to males and 129 weeks to females. There were body weight decreases in both sexes at the high and mid doses. The non-glandular stomach was eroded and ulcerated. Histologically, there were compound-related effects on the kidneys, esophagus, stomach and duodenum. Chronic glomerulonephritis, hyperplasia of cortical tubules and pelvic/papillary epithelium tubular cysts, renal adenomas and carcinomas as well as stomach papillomas were present at all dose levels. Testing yielded negative results for chromosomal aberrations and micronuclei induction in either rats or Chinese hamsters administered gavage doses up to 5000 mg/kg/day for 2 days or mice receiving 2500 mg/kg/day for 2 consecutive days. In inhalation studies assessing genotoxic potential of chlorothalonil drift in mice, no significant difference in DNA damage was observed between exposed and control animals. ECOTOXICITY STUDIES: A larval rearing method was adapted to assess the chronic oral toxicity to honey bee larvae of the four most common pesticides detected in pollen and wax: fluvalinate, coumaphos, chlorothalonil, and chloropyrifos (tested alone and in all combinations). All pesticides at hive-residue levels triggered a significant increase in larval mortality compared to untreated larvae by over two fold, with a strong increase after 3 days of exposure. Among these four pesticides, honey bee larvae were most sensitive to chlorothalonil compared to adults. In an avian reproduction study using Mallard duck, reduction in eggshell thickness was seen at 100 ppm. At 250 ppm adult body weight, food consumption, and gonad development were affected, there were also effects on numbers of eggs laid, embryonic development, eggshell thickness, hatchability, and hatching survival. Worms reared in soil in which chlorothalonil had been incorporated (5 times the recommended application rate at 0.9 g in 4700 cu cm of soil) showed reduction in longevity of about 50% compared to controls after the beginning of treatment, and reproduction was virtually eliminated.

USGS Health-Based Screening Levels for Evaluating Water-Quality:

This section provides the USGS Health-Based Screening Levels for Evaluating Water-Quality data.

Chemical

>> Chlorothalonil

Noncancer HBSL (Health-Based Screening Level)[µg/L]

>> 100

Reference

>> Smith, C.D. and Nowell, L.H., 2024. Health-Based Screening Levels for evaluating water-quality data (3rd ed.). DOI:10.5066/F71C1TWP

Evidence for Carcinogenicity:

Evidence that this chemical does or may cause cancer. The information here is collected from various sources by the Hazardous Substances Data Bank (HSDB).

>> Cancer Classification: Group B2 Probable Human Carcinogen

Carcinogen Classification:

This section provides the International Agency for Research on Cancer (IARC) Carcinogenic Classification and related monograph links. In the IARC Carcinogenic classification, chemicals are categorized into four groups: Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), Group 2B (possibly carcinogenic to humans), and Group 3 (not classifiable as to its carcinogenicity to humans).

IARC Carcinogenic Agent

>> Chlorothalonil

IARC Carcinogenic Classes

>> Group 2B: Possibly carcinogenic to humans

IARC Monographs

>> Volume Sup 7: Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs Volumes 1 to 42, 1987; 440 pages; ISBN 92-832-1411-0 (out of print)

>> Volume 73: (1999) Some Chemicals that Cause Tumours of the Kidney or Urinary Bladder in Rodents and Some Other Substances

>> 2B, possibly carcinogenic to humans. (L135)

Health Effects:

>> Exposure to high levels of cyanide for a short time harms the brain and heart and can even cause coma, seizures, apnea, cardiac arrest and death. Chronic inhalation of cyanide causes breathing difficulties, chest pain, vomiting, blood changes, headaches, and enlargement of the thyroid gland. Skin contact with cyanide salts can irritate and produce sores. (L96, L97)

Exposure Routes:

>> The substance can be absorbed into the body by inhalation.

>> Oral (L96) ; inhalation (L96) ; dermal (L96)

Skin Exposure

>> Redness.

Eye Exposure

>> Redness. Pain. Blurred vision.

Ingestion Exposure

>> Burning sensation in the throat and chest. Abdominal pain.

>> Cyanide poisoning is identified by rapid, deep breathing and shortness of breath, general weakness, giddiness, headaches, vertigo, confusion, convulsions/seizures and eventually loss of consciousness. (L96, L97)

Target Organs:

Organs that are affected by exposure to this chemical. Information in this section reflects human data unless otherwise noted.

>> Urinary

Adverse Effects:

An adverse effect is an undesired harmful effect resulting from a medical treatment or other intervention.

>> Skin Sensitizer - An agent that can induce an allergic reaction in the skin.

>> Asthma - Reversible bronchoconstriction (narrowing of bronchioles) initiated by the inhalation of irritating or allergenic agents.

>> IARC Carcinogen - Class 3: Chemicals are not classifiable by the International Agency for Research on Cancer.

Toxicity Data:

>> LC50 (rat) = 92 mg/m3

Treatment:

Treatment when exposed to toxin

>> Antidotes to cyanide poisoning include hydroxocobalamin and sodium nitrite, which release the cyanide from the cytochrome system, and rhodanase, which is an enzyme occurring naturally in mammals that combines serum cyanide with thiosulfate, producing comparatively harmless thiocyanate. Oxygen therapy can also be administered. (L97)

Interactions:

>> ... Japanese medaka (Oryzias latipes) /were exposed/ to environmentally relevant concentrations of azinphos-methyl, chlorothalonil, endosulfan, and mixtures of all three ... Fry exposed to ... chlorothalonil and a combination of the chemicals showed reduced activity. Adult sex ratios were biased toward females ... with those exposed to azinphos-methyl, chlorothalonil, and the pesticide mixture departing significantly from an even sex ratio. There was no evidence of additive or synergistic effects of pesticide mixtures.

Antidote and Emergency Treatment:

>> 1. Wash off dermal contamination with soap and water. Remove contamination of the eyes by flushing with copious amounts of water. If irritation persists, specialized medical care should be obtained. /Substituted benzenes/

Human Toxicity Excerpts:

>> /HUMAN EXPOSURE STUDIES/ Patch testing indicated that 10-28% of 88 Japanese farmers were sensitive to chlorothalonil and other pesticides; 35 had acute dermatitis. In some cases, photosensitization was involved.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ The dermal MLD (maximum lethal dose) was >10,000 mg/kg in rabbits with no deaths observed at this dose. In this study, Chlorothalonil was applied to abraded skin for 24 hr. Slight edema and yellow discoloration were observed at the application site and eye irritation was also seen. At necropsy, pale areas were observed in the liver.

Non-Human Toxicity Values:

>> LD50 Mouse ip 2500 mg/kg

National Toxicology Program Studies:

Reports from the National Toxicology Program, an interagency program supported by three government agencies (NIH, FDA, and CDC) within the Department of Health and Human Services. This program plays a critical role in generating, interpreting, and sharing toxicological information about chemicals of public health concerns.

>> Osborne-Mendel rats and B6C3F1 mice were administered chlorothalonil in their diet for 80 wk. Rats were than observed for 30-31 wk and mice for 11-12 wk. The time weighted average doses for rats were 5063 or 10,126 ppm, for male mice 2688 or 5375 ppm, and for female mice 3000 or 6000 ppm. All animals were observed twice daily for signs of toxicity. After death or sacrifice gross and microscopic examination of major tissues, organs and all gross lesions was carried out. In mice the occurrence of tumors in dosed animals was no higher than controls. In rats adenomas and carcinomas of the renal tubular epithelium occurred with a significant dose related trend. In males the incidence was 0/62 for pooled controls, 3/46 for low-dose, and 4/49 for high dose; in females the incidence was 0/62 for pooled controls, 1/48 for low dose and 5/50 for high dose. It was concluded that under the conditions of this bioassay, chlorothalonil is carcinogenic to Osborne-Mendel rats, but not to B6C3F1 mice.

12. Ecological Information

Resident Soil (mg/kg)

>> 3.20e+01

Industrial Soil (mg/kg)

>> 1.40e+02

Tapwater (ug/L)

>> 4.00e+00

MCL (ug/L)

>> 8.0E+01(G)

Risk-based SSL (mg/kg)

>> 9.00e-03

Oral Slope Factor (mg/kg-day)-1

>> 1.70e-02

Chronic Oral Reference Dose (mg/kg-day)

>> 1.50e-02

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Fraction of Contaminant Absorbed Dermally from Soil

>> 0.1

ICSC Environmental Data:

>> The substance is very toxic to aquatic organisms. This substance does enter the environment under normal use. Great care, however, should be taken to avoid any additional release, for example through inappropriate disposal.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SOIL: The mean concentration of chlorothalonil in soils from an agricultural area of Jordan was reported as 1.57 ppm(1). Chlorothalonil was detected at <2.2-1060 pg/g dry weight at 20 sampling sites throughout Costa Rica; most sites were in protected areas where the chemical was not directly used; samples were collected in Feb 2004(2). Chlorothalonil was detected in the soil of 3 of 8 and 5 of 6 points along transects of Observation Peak, Alberta and Yoho National Park, British Columbia at 10-29 and 77-196 pg/g dry weight, respectively; chlorothalonil was not detected in 8 soil samples collected along a transect of Mount Revelstoke, British Columbia(3). Chlorothalonil was detected in soil samples near banana plantations in the Caribbean at 40 ng/g dry weight sampled in 1992(4). Chlorothalonil was not detected (detection limit not reported) in eight samples taken along the northern slope of Turrialba Volcano, Costa Rico; samples were collected Oct 2006(5).

Fish/Seafood Concentrations:

Concentrations of this compound in fish or seafood.

>> Chlorothalonil was detected in fish from the Salton Sea, CA at mean levels of 0.3 to 1.2 ng/g (Corvina species) and 0.5 to 1.6 ng/g (Tilapia species)(1).

Animal Concentrations:

Concentrations of this compound in animals.

>> Chlorothalonil was not detected (detection limit 10 ng/g) in the fat of Nile monitor (Varanus niloticus); 18 samples were collected from Niono and 14 from Flabougou, Mali in Nov 2008; 32 samples were collected from Diffa and 7 from Niamey, Niger in Nov 2009(1). Chlorothalonil was detected in zooplankton from three lakes in southern Ontario, Canada at <0.002-0.030 ng/g wet weight; samples were collected 2003 and 2004(2).

Average Daily Intake:

The average amount of the compound taken into the body through eating, drinking, or breathing.

>> According to data obtained from a Canadian national survey in 1973, the daily intake of chlorothalonil from garden fruits was 0.04 ug/person/day in Montreal during the winter(1).

13. Disposal Considerations

Spillage Disposal

>> Personal protection: chemical protection suit and protective gloves. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers. If appropriate, moisten first to prevent dusting. Carefully collect remainder. Then store and dispose of according to local regulations.

Disposal Methods

>> SRP: The most favorable course of action is to use an alternative chemical product with less inherent propensity for occupational harm/injury/toxicity or environmental contamination. Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in soil or water; effects on animal and plant life; and conformance with environmental and public health regulations.

>> Chlorothalonil can be incinerated in a unit operating @ 850 °C equipped with off-gas scrubbing equipment. Recommendable method: Incineration.

>> Safe Disposal of Pesticides. The best way to dispose of small amounts of excess pesticides is to use them - apply them - according to the directions on the label. If you cannot use them, ask your neighbors whether they have a similar pest control problem and can use them. If all of the remaining pesticide cannot be properly used, check with your local solid waste management authority, environmental agency, or health department to find out whether your community has a household hazardous waste collection program or a similar program for getting rid of unwanted, leftover pesticides. These authorities can also inform you of any local requirements for pesticide waste disposal.

>> Safe Disposal of Pesticides. An empty pesticide container can be as hazardous as a full one because of residues left inside. Never reuse such a container. When empty, a pesticide container should be rinsed carefully three times and the rinsewater thoroughly drained back onto the sprayer or the container previously used to mix the pesticide. Use the rinsewater as a pesticide, following label directions. Replace the cap or closure securely. Dispose of the container according to label instructions. Do not puncture or burn a pressurized container like an aerosol - it could explode. Do cut or puncture other empty pesticide containers made of metal or plastic to prevent someone from reusing them. Wrap the empty container and put it in the trash after you have rinsed it.

14. Transport Information

DOT

Chlorothalonil
6.1

IATA

Chlorothalonil
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15. Regulatory Information

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: 1,3-Benzenedicarbonitrile, 2,4,5,6-tetrachloro-

REACH Registered Substance

>> Status: Active Update: 17-10-2022 https://echa.europa.eu/registration-dossier/-/registered-dossier/32255

New Zealand EPA Inventory of Chemical Status

>> Chlorothalonil: HSNO Approval: HSR002825 Approved with controls

16. Other Information

Toxic Combustion Products:

Toxic products (e.g., gases and vapors) produced from the combustion of this chemical.

>> Carbon oxides, nitrogen oxides (NOx), Hydrogen chloride gas

Other Safety Information

Chemical Assessment

>> IMAP assessments - 1,3-Benzenedicarbonitrile, 2,4,5,6-tetrachloro-: Environment tier I assessment

>> IMAP assessments - CMR chemicals not registered under REACH: Human health tier II assessment

"The information provided is believed to be accurate but is not comprehensive and should be used as a reference. It reflects our current knowledge and is intended for safety guidance related to the product. This document does not constitute a warranty of the product's properties. Ionz is not responsible for any damages resulting from handling or contact with the product incorrectly."