ionz

SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : Diethyl phthalate
Catalog Number : io-2217
CAS Number : 84-66-2
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)

Note

>> This chemical does not meet GHS hazard criteria for 96.6% (1692 of 1751) of all reports. Pictograms displayed are for 3.4% (59 of 1751) of reports that indicate hazard statements.

GHS Hazard Statements

>> Not Classified

>> Reported as not meeting GHS hazard criteria by 1692 of 1751 companies (only 3.4% companies provided GHS information). For more detailed information, please visit ECHA C&L website.

Pictogram(s)

>> Warning

Precautionary Statement Codes

>> P261, P264, P264+P265, P271, P272, P273, P280, P302+P352, P304+P340, P305+P351+P338, P319, P321, P332+P317, P333+P317, P337+P317, P362+P364, P403+P233, P405, and P501

NFPA 704 Diamond

NFPA Health Rating

>> 1 - Materials that, under emergency conditions, can cause significant irritation.

NFPA Fire Rating

>> 1 - Materials that must be preheated before ignition can occur. Materials require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur.

NFPA Instability Rating

>> 0 - Materials that in themselves are normally stable, even under fire conditions.

Health Hazards:

>> Symptoms unlikely from any form of exposure. (USCG, 1999)

>> Special Hazards of Combustion Products: Irritating vapors of unburned chemical may form in fire. (USCG, 1999)

>> Combustible. Gives off irritating or toxic fumes (or gases) in a fire.

3. Composition/Information On Ingredients

Chemical name : Diethyl phthalate
CAS Number : 84-66-2
Molecular Formula : C12H14O4
Molecular Weight : 222.2400 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. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. 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. (NTP, 1992)

First Aid Measures

Inhalation First Aid

>> Fresh air, rest.

Skin First Aid

>> Remove contaminated clothes. Rinse skin with plenty of water or shower.

Eye First Aid

>> First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Ingestion First Aid

>> Rinse mouth. Give one or two glasses of water to drink. Refer for medical attention .

5. Fire Fighting Measures

>> Poisonous gases are produced in fire. ... Storage containers and parts of containers may rocket great distances, in many directions.

>> Use alcohol-resistant foam, powder, carbon dioxide.

6. Accidental Release Measures

Spillage Disposal:

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

>> Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

7. Handling And Storage

Storage Conditions:

>> Storage temp: ambient; venting: open.

8. Exposure Control/ Personal Protection

REL-TWA (Time Weighted Average)

>> 5 mg/m³

>> TWA 5 mg/m3

>> none See Appendix G

>> 5.0 [mg/m3]

>> 5 mg/m

TLV-TWA (Time Weighted Average)

>> 5 mg/m³ [1996]

Inhalation Risk:

>> A harmful contamination of the air will not or will only very slowly be reached on evaporation of this substance at 20 °C.

Fire Prevention

>> NO open flames.

Inhalation Prevention

>> Use ventilation. Use local exhaust.

Skin Prevention

>> Protective gloves.

Eye Prevention

>> Wear safety spectacles.

Ingestion Prevention

>> Do not eat, drink, or smoke during work.

9. Physical And Chemical Properties

Molecular Weight:

>> 222.24

Exact Mass:

>> 222.08920892

Physical Description:

>> Diethyl phthalate appears as a clear, colorless liquid without significant odor. More dense than water and insoluble in water. Hence sinks in water. Primary hazard is to the environment. Spread to the environment should be immediately stopped. Easily penetrates soil, contaminates groundwater and nearby waterways. Flash point 325 °F. Severely irritates eyes and mildly irritates skin. Used in the manufacture of perfumes, plastics, mosquito repellents and many other products.

>> COLOURLESS OILY LIQUID.

Color/Form:

>> Colorless oily liquid

Odor:

>> Practically odorless

Taste:

The sensation of flavor perceived in the mouth and throat on contact with a substance.

>> Bitter disagreeable taste

Boiling Point:

>> 568 °F at 760 mmHg (NTP, 1992)

>> 295 °C

Melting Point:

>> 27 °F (NTP, 1992)

>> -67 - -44 °C

Flash Point:

>> 284 °F (NTP, 1992)

>> 117 °C c.c.

Solubility:

>> less than 1 mg/mL at 66 °F (NTP, 1992)

>> Solubility in water at 25 °C: none

Density:

>> 1.12 at 68 °F (USCG, 1999) - Denser than water; will sink

>> Relative density (water = 1): 1.1

Vapor Density:

>> 7.66 (NTP, 1992) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 7.7

Vapor Pressure:

>> 1 mmHg at 227.8 °F ; 5 mmHg at 285.3 °F (NTP, 1992)

LogP:

>> log Kow = 2.47

>> 2.47

Stability/Shelf Life:

>> STABLE TO LIGHT

Autoignition Temperature:

>> 855 °F (USCG, 1999)

>> 457 °C

Decomposition:

>> When heated to decomp it emits acrid smoke and irritating fumes.

Viscosity:

>> 31.3 centistokes at 0 °C

Heat of Combustion:

>> -10,920 BTU/LB= -6,070 CAL/G= -254X10+5 J/KG

Heat of Vaporization:

>> 170 BTU/LB= 96 CAL/G= 4.0X10+5 J/KG

Surface Tension:

>> 37.5 dynes/cm at 20 °C

Refractive Index:

>> Index of refraction: 1.5002 at 25 °C/D

Collision Cross Section:

Collision cross section (CCS) represents the effective area for the interaction between an individual ion and the neutral gas through which it is traveling (e.g., in ion mobility spectrometry (IMS) experiments). It quantifies the probability of a collision taking place between two or more particles.

>> 165.23 Å² [M+Na]+ [CCS Type: DT; Method: stepped-field]

10. Stability And Reactivity

>> Insoluble in water.

11. Toxicological Information

Toxicity Summary:

>> Phthalate esters are endocrine disruptors. They decrease foetal testis testosterone production and reduce the expression of steroidogenic genes by decreasing mRNA expression. Some phthalates have also been shown to reduce the expression of insulin-like peptide 3 (insl3), an important hormone secreted by the Leydig cell necessary for development of the gubernacular ligament. Animal studies have shown that these effects disrupt reproductive development and can cause a number of malformations in affected young. (A2883)

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

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

Chemical

>> Diethyl phthalate

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

>> 5000

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 D Not Classifiable as to Human Carcinogenicity

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).

>> No indication of carcinogenicity to humans (not listed by IARC).

Health Effects:

>> Phthalate esters are endocrine disruptors. Animal studies have shown that they disrupt reproductive development and can cause a number of malformations in affected young, such as reduced anogenital distance (AGD), cryptorchidism, hypospadias, and reduced fertility. The combination of effects associated with phthalates is called 'phthalate syndrome'. (A2883)

Exposure Routes:

>> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

>> inhalation, ingestion, skin and/or eye contact

Inhalation Exposure

>> Dizziness. Lethargy.

Ingestion Exposure

>> Abdominal pain. Nausea.

>> irritation eyes, skin, nose, throat; headache, dizziness, nausea; lacrimation (discharge of tears); possible polyneuropathy, vestibular dysfunc; pain, numb, lassitude (weakness, exhaustion), spasms in arms & legs; In Animals: reproductive effects

Target Organs:

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

>> Developmental (effects while organs are developing), Hepatic (Liver), Reproductive (Producing Children)

Adverse Effects:

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

>> Reproductive Toxin - A chemical that is toxic to the reproductive system, including defects in the progeny and injury to male or female reproductive function. Reproductive toxicity includes developmental effects. See Guidelines for Reproductive Toxicity Risk Assessment.

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

>> ACGIH Carcinogen - Not Classifiable.

Toxicity Data:

>> LD50: 8600 mg/kg (Oral, Mouse) (A719) LD50: 2800 mg/kg (Intraperitoneal, Mouse) (A719) LD50: >20 mL/kg (Dermal, Guinea pig) (L1901) LC50: >4.64 mg/L over 6 hours (Inhalation, Rat) (L1901)

Minimum Risk Level:

The minimal risk level (MRL) is an estimate of the amount of a chemical a person can eat, drink, or breathe each day without a detectable risk to health

>> Acute Oral: 7 mg/kg/day (L134) Intermediate Oral: 6 mg/kg/day (L134)

Antidote and Emergency Treatment:

>> Inhalation: remove to fresh air. Eyes: flush with water. Skin: flush with water, wash well with soap and water.

Human Toxicity Excerpts:

>> /HUMAN EXPOSURE STUDIES/ DBP, DMP, and DEP in concentrations of 2 percent in petrolatum and DBP at 5 percent in petrolatum were nonirritating in 48-hour closed patch tests; the 2 percent concentrations were tested on 1532 subjects with 1 positive reaction, and the 5 percent DBP was tested on 53 subjects with no positive reactions.

Non-Human Toxicity Excerpts:

>> /LABORATORY ANIMALS: Acute Exposure/ MOST OF 12 PHTHALIC ACID ESTERS TESTED PRODUCED A PROLONGATION OF PENTOBARBITAL SLEEPING TIME IN MICE PRETREATED WITH A PHTHALATE ESTER. /PHTHALIC ACID ESTERS/

Non-Human Toxicity Values:

>> LC50 Rat inhalation >4.64 mg/L for 6 hr

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.

>> Diethylphthalate (DEP) was tested for reproductive toxicity in the standard Continuous Breeding design using Swiss CD-1 mice. Data collected in the Task 1 dose-range-finding study (body weight, clinical signs, food & water consumptions) were used to select concns of 0.0, 0.25, 1.25, & 2.5% in feed for the main study. Feed consumption was not affected by the presence of diethylphthalate. These concns in feed gave calculated consumption estimates of 0.34, 1.77, & 3.64 g DEP/kg bw/day. Diethylphthalate consumption had no adverse effect on the mean number of litters/pair, the number of live pups/litter, the viability of the pups, or pup body weight adjusted for litter size. In fact, the number of pups/litter were increased at the low & middle doses by 32% & 14%, respectively. We attribute this to the fact that the value for the controls was nearly equal to 25% below historical values for this strain. Because there was no observable change in fertility or reproductive outcome, Task 3 (the crossover mating trial to determine the affected sex) was not conducted. The second generation was tested using the F1 mice from the control & high dose groups. There was no difference between these two groups in terms of body weights or viability of the F1 pups at birth, weaning, or at the start of the wk of mating (/postnatal day/ 74 +/- 10). All 20 pairs of mice mated in both groups, & 95% of those delivered live young (in both groups). The DEP litters had 14% fewer pups; viability & pup weight adjusted for litter size were unchanged. After the F2 pups were evaluated & discarded, the F1 adults were killed & necropsied. Treated females weighed 8% less, while adjusted liver weight was increased by 28%. Treated males weighed 12% less than their respective controls, while their liver weight & prostate weight, both adjusted for body weight, were increased by 18% & 32%, respectively. Epididymal sperm concn was reduced by 30%, while the percent motile sperm & the proportion of abnormal forms were unaffected by DEP. In summary, DEP had no effect on F0 reproductive performance, while producing moderate reproductive effects in the second generation in the presence of mild body weight gain inhibitions & moderate increases in liver weight.

12. Ecological Information

Resident Soil (mg/kg)

>> 5.10e+04

Industrial Soil (mg/kg)

>> 6.60e+05

Tapwater (ug/L)

>> 1.50e+04

MCL (ug/L)

>> 6.00e+00

Risk-based SSL (mg/kg)

>> 6.10e+00

Chronic Oral Reference Dose (mg/kg-day)

>> 8.00e-01

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Fraction of Contaminant Absorbed Dermally from Soil

>> 0.1

ICSC Environmental Data:

>> This substance may be hazardous to the environment. Special attention should be given to fish.

Sediment/Soil Concentrations:

Concentrations of this compound in sediment/soil.

>> SEDIMENT: Diethyl phthalate was detected in the sediment of the San Luis Pass in the Gulf of Mexico at a concn of 5 ng/g and in the sediment of the Chesapeake Bay at a concn of 42 ng/g(1). Diethyl phthalate was detected in the sediment of the Yssel River in the Netherlands at concns of 0.2-0.8 mg/kg(2) and in the sediment of the Klang River in Malaysia at concns of 0-3.4 ng/g(3). Diethyl phthalate was identified, not quantified, in the sediment of Newark Bay, NJ(4). Diethyl phthalate was detected in the sediment of the Detroit River at concns of 0.12-0.66 mg/kg(5). Diethyl phthalate was detected in sediment from Lake Jusan and Mutsu Bay, in Japan(6). Diethyl phthalate was identified in sediment samples taken Sept 1995 at the mouth of 2 of 3 rivers and in 1 port in Niigata, Japan(7). Diethyl phthalate was detected in sediment in 7 of 7 sites in the German Bight area(8). Diethyl phthalate was found in 6 of 12 samples taken on the Huaihe River in China the summer of 2002; 0.14 and 0.21 ug/L were found in samples taken at the Huaihe River bridge and 0.12, 0.16, 0.13 and 0.89 ug/L was found in samples at Hongguang near a chemical plant(9). Diethyl phthalate was also found in sediment samples at concns of 0.64 and 0.65 ug/L at the Huaihe River bridge and 0.55 and 0.57 ug/L at Hongguang(9). Diethyl phthalate was found in 12.8% of 430 sites sampled from 19 major US river basins from Aug 1992 to March 1995 with a maximum concn of 67 ug/kg(10). United Kingdom estuaries sampled May 1988 to Dec 1989 contained 0.015, 0.43, 0.017, <0.001, <0.001, <0.018, 0.01, and 0.051 mg/L of diethyl phthalate in the Tyne, Tees, Humber, Thames, Solent, Plymouth Sound, Dee and Mersey river sediments, respectively(11). Diethyl phthalate was found in surface sediment samples at 4 sites in False Creek in Vancouver, Canada(12). Diethyl phthalate was not detected in sediments near a sewage treatment plant outflow in Hamilton Harbour, Ontario, Canada from samples taken in the summer of 1997 in the city of Burlington(13).

Fish/Seafood Concentrations:

Concentrations of this compound in fish or seafood.

>> Diethyl phthalate was detected in edible fish from Wisconsin lakes and rivers at concns of less than 0.02 mg/kg to 0.20 mg/kg(1). Diethyl phthalate was detected in fish at concns of 0.0875 ppm in Tacoma Washington(2). Diethyl phthalate was analyzed for in aquatic organisms June to Sept 1999 from False Harbor, Vancouver, British Columbia (species, concn in ng/g lipid): blue mussels (Mytilus edulis) 2.22, Pacific oysters (Crassostrea gigas) 2.16, geoduck clams (Panope abrupta) 2.60, manila clams (Tapes philippinarum) 2.17, dungeness crabs (Cancer magister) 1.69, purple seastar (Pisaster ochraccus) 1.91, juvenile shiner perch (Cyrnatogaster aggragata) 2.12, Pacific herring (Clupea harengus pallasi) 1.86, pile perch (Rhacochilus vacca) 2.76, striped seaperch (Embiotoca lateralis) 2.99, Pacific staghorn sculpin (Leptocottus armatus) 2.69, English sole (Pleuronectes ventulus) 2.81, white-spotted greenling (Hexogrammos stelleri) 2.76, spiny dogfish (Squalus acanthias) muscle 2.05, liver 1.51, embryo 1.99, surf scoters (Melanitta perspicillata) 2.23, and plankton (composite of phytoplankton, zooplankton and other pelagic invertebrates) 2.85(3). Diethyl phthalate was found in charybdis feriatus crabs at 0.4 ug/kg, 0.2 ug/kg, and 1.1 ug/kg in the leg, body and carapace, respectively(4). Three seaperch (Embiotoea lateralis) taken from False Creek, Vancouver, Canada contained approximately 1 ppb of diethyl phthalate(5).

13. Disposal Considerations

Spillage Disposal

>> Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Disposal Methods

>> [40 CFR 240-280, 300-306, 702-799 (7/1/2006)] Generators of waste (equal to or greater than 100 kg/mo) containing this contaminant, EPA hazardous waste number U088, must conform with USEPA regulations in storage, transportation, treatment and disposal of waste.

>> Good candidate for liquid injection incineration, with a temperature range of 650 to 1,600 °C and a residence time of 0.1 to 2 seconds. Good candidate for rotary kiln incineration, with a temperature range of 820 to 1,600 °C and a residence time of seconds. Also a good candidate for fluidized bed incineration, with a temperature range of 450 to 980 °C and a residence time of seconds.

>> Atomize into an incinerator; combustion may be improved by mixing with a more flammable solvent. Recommendable methods: Incineration, landfill & use as boiler fuel. Peer-review: Adsorb on vermiculite or similar adsorbent and landfill. (Peer-review conclusions of an IRPTC expert consultation (May 1985))

>> 1. A gas-pipe the gas into the incinerator or lower into a pit and allow it to burn away. 2. A liquid-atomize into an incinerator. Combustion may be improved by mixing with a more flammable solvent. 3. A solid-make up packages in paper or other flammable material. Burn in the incinerator. Or the solid may be dissolved in a flammable solvent and sprayed into the fire chamber.

14. Transport Information

DOT

Diethyl phthalate

Reportable Quantity of 1000 lb or 454 kg

IATA

Diethyl phthalate

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15. Regulatory Information

Federal Drinking Water Guidelines:

Federal drinking water guidelines (e.g. maximum containment level (MCL)) for this chemical. In general, these guidelines are recommendations and not legally enforceable.

>> EPA 5000 ug/l

Clean Water Act Requirements:

The Clean Water Act (CWA) of 1972 establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under CWA, the U.S. Environmental Protection Agency (EPA) developed the Toxic Pollutant List (40 CFR Part 401.15) and the Priority Pollutant List (40 CFR Part 423, Appendix A). These lists are to be used by EPA and States to develop the Effluent Guidelines regulations and ensure water quality criteria and standards.

>> For the protection of human health from the toxic properties of diethyl phthalate ingested through water and contaminated organisms, the ambient water criterion is determined to be 350 mg/l. For the protection of human health from the toxic properties of diethyl phthalate ingested through contaminated aquatic organisms alone, the ambient water criterion is determined to be 1.8 g/l.

TSCA Requirements:

This section provides information on requirements concerning this chemical under the Toxic Substances Control Act (TSCA) of 1976. TSCA provides EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. Certain substances are generally excluded from TSCA, including, among others, food, drugs, cosmetics and pesticides.

>> Pursuant to section 8(d) of TSCA, EPA promulgated a model Health and Safety Data Reporting Rule. The section 8(d) model rule requires manufacturers, importers, and processors of listed chemical substances and mixtures to submit to EPA copies and lists of unpublished health and safety studies. 1,2-Benzenedicarboxylic acid, diethyl ester is included on this list. Effective date 10/04/82; Sunset date 10/04/92.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: 1,2-Benzenedicarboxylic acid, diethyl ester

>> Specific Information Requirement: Obligations to provide information apply. You must tell us within 28 days if the circumstances of your importation or manufacture (introduction) are different to those in our assessment.

REACH Registered Substance

>> Status: Active Update: 18-04-2023 https://echa.europa.eu/registration-dossier/-/registered-dossier/14869

>> Status: Active Update: 12-11-2012 https://echa.europa.eu/registration-dossier/-/registered-dossier/1950

>> Status: No longer Valid Update: 18-12-2015 https://echa.europa.eu/registration-dossier/-/registered-dossier/16604

New Zealand EPA Inventory of Chemical Status

>> Diethyl phthalate: Does not have an individual approval but may be used under an appropriate group standard

16. Other Information

Toxic Combustion Products:

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

>> IRRITATING VAPORS OF UNBURNED CHEMICAL MAY FORM IN FIRE

Other Safety Information

Chemical Assessment

>> IMAP assessments - 1,2-Benzenedicarboxylic acid, diethyl ester: Human health tier I assessment

>> PEC / SN / Other assessments - Diethyl phthalate (DEP): Health

"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."