

'DOCK/ CHEMICALS

SEMICONDUCTORS DECISION



Low Temperature decomposing Zn- Precursor
for MOVPE

'MO-III/V

BP: 118°C/244°F/1013 hPa

'DEZn-Diethylzinc

**MATERIAL SAFETY
DATASHEET**

'DEZn-Diethylzinc

Diethylzinc C₄H₁₀Zn

Revision Date: 08.07.2015

According to EC-Directive
1907/2006/EC

'MO-III/W

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND COMPANY

1.1 Identification of the product

Product name: Diethylzinc
Acronym: DEZn

1.2 Manufacturer / Supplier Information

Dockweiler Chemicals GmbH
Emil-von-Behring-Str. 76, Postfach 1746, 35007 Marburg, Germany
T +49 6421 39 -6380 | F -6381

Contact for Information

Dockweiler Chemicals GmbH
T +49 6421 39 -6380 | F -63 81

1.3 Emergency telephone no.: +49 178 433 74 34

In case of intoxication:
Giftnotrufzentrale - Munich
T +49 89 41 40 -2211 / -2240 | F +49 89 41 40 -2467
In case of burn: local hospital and/or specialist near at hand

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008

Flammable Liquids (Category 2)
Pyrophoric Liquids (Category 1)
Chronic Aquatic Toxicity (Category 1)
Water Reactive Liquid (Category 1)
Serious Eye Damage (Category 1)

2.2 Label elements

Labelling according Regulation (EC)

No. 1272/2008

GHS-Classification

Pictogram:



Signal Word: **DANGER**

Hazard and Precautionary Statements:

H260 In contact with water releases flammable gases which may ignite spontaneously.
H250 Catches fire spontaneously if exposed to air.
H260 In contact with water releases flammable gases which may ignite spontaneously.
H314 Causes severe skin burns and eye damage.
H410 Very toxic to aquatic life with long lasting effects.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P222 Do not allow contact with air.
P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231+ P232 Handle under inert gas. Protect from moisture.

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www.dockchemicals.com

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P273 Avoid release to the environment.
P280d Wear protective gloves, eye/face protection and protective clothing.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do not induce vomiting.
P302+P334 IF ON SKIN: Immerse in cool water/wrap in wet bandages.
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/physician. P363 Wash contaminated clothing before reuse.
P378 Use vermiculite, dry chemical powder or dry sand for extinction.
P402+P404 Store in a dry place. Store in a closed container.
P422 Store contents under nitrogen.
P501 Dispose of contents and container according to local regulation.

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Synonym:	DEZn (purity 100% w/w)
CAS-No.:	557-20-01
EG-Index-No.:	n.r.
EC-No.:	209-161-3
ELINCS-No.:	n.r.
Molar mass [g/mol]:	123.5
Molecular formula:	C ₄ H ₁₀ Zn
Dangerous ingredients:	none

4. FIRST AID MEASURES

Causes burns. Causes injury to the cornea and eyelids. Risk of serious damage to eyes. Irritating to respiratory system, may cause delayed pulmonary oedema.

4.1 Description of first aid measures

General

Call a physician immediately.

Eyes

Immediately start continuous flushing of eyes with water for at least 15 minutes. If easy to do, contact lenses should be removed during the flushing, by trained personnel. Hold the eyelids apart during the flushing to ensure rinsing the entire surface of the eye and lids with water. Get medical attention immediately.

Skin contact

While wearing impervious gloves and air-tight safety goggles, immediately start continuous flushing of all affected areas on the victim with water for at least 15 minutes.

If victim is wearing air-tight safety goggles, do not remove them. Remove contaminated clothing and shoes. If clothing is stuck to the skin after flushing with water, do not remove it. Get medical attention immediately. Wash or destroy clothing. Thoroughly clean or destroy contaminated shoes.

Ingestion

Do not induce vomiting. Get medical attention immediately by calling a physician or a poison control center. If victim is conscious and alert, give a cupful of water. Never give anything by mouth to an unconscious or convulsing person. If vomiting occurs, the patient should lie on their left side while vomiting to reduce the risk of aspiration.

Advice to physician

Persons with pre-existing skin, eye, or respiratory disease may be at increased risk from the irritant or allergic properties of this material. Irrigate burn area with large amounts of water to decontaminate, if not already done. Chemical burns on the skin should then be treated like thermal burns. Skin reactions may take 24-48 hours to develop. If eyes are affected, flush eyes with buffered or plain irrigating solutions for at least 15 minutes, if not already done. If any ulceration or conjunctival injury is present, have an ophthalmologist examine the patient. Application of cool water helps relieve pain and swelling of both the skin and eyes. If swallowed, do not induce vomiting. Give patient plenty of water to drink. Ingestion of this corrosive material may cause severe ulceration, inflammation, and possible perforation of the gastrointestinal tract. Maintain adequate airway. Aspiration during induced emesis can result in severe lung injury. Contact a Poison Control Center for additional treatment information. Treat any additional effects symptomatically.

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5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Vermiculite, dry chemical powder, dry sand.

Unsuitable extinguishing media

Never use water!!! See also Section: Other information.

foam

halones

5.2 Hazardous decomposition / combustion products

Products of complete combustion are carbon dioxide, water and zinc oxide.

Additionally, products of incomplete combustion may include carbon monoxide, elemental carbon and hydrocarbons (alkanes and alkenes).

5.3 Advice for firefighters

Firefighters must wear fire resistant protective equipment. Wear approved respirator and protective gloves.

5.4 Further information

Evacuate personnel to safe areas in case the tank or cylinders is directly in a fire or exposed to elevated temperatures for prolonged time, the tank or cylinder can burst violently. Consider to let it burn out completely. Waterspray may only be used by experienced fire fighters. Cool adjacent equipment with water from safe distance. After a fire, ventilate thoroughly the area and soak with water, clean the walls and metallic surfaces.

Fire and explosion hazard

Caution: Reignition may occur. Vapors produced by incomplete combustion may form explosive mixtures with air. In case of fire and/or explosion do not breathe fumes.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personnel Precautions

Do not breathe fumes/vapor. Avoid contact with skin and eyes. For personal protection see Section 8.

6.2 Environmental Precautions

Do not allow to enter drains or water courses.

6.3 Methods for cleaning up

Stop leakage if possible. Eliminate all sources of ignition, and do not generate flames or sparks. Take precautionary measures against static discharges. Allow controlled hydrolysis. Isolate spill area. After fire has been extinguished or has been allowed to burn out completely, wait considerable time (until smoke is no longer observed). After that, carefully wash spill area with a waterspray.

6.4 Other information

Ignition will occur. Evacuate personnel to safe area.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

In order to prevent thermal decomposition do not overheat ($T > 70^{\circ}\text{C}$ / 185°F exothermic).

Local overheating and resulting thermal decomposition may cause the tank or cylinder to burst violently. When using do not eat, drink or smoke. Handle in well ventilated areas. Eliminate all sources of ignition, and do not generate or sparks. Take precautionary measures against static discharges. Apply earthing when transferring one container to another. Avoid contact with moisture and water. Keep under nitrogen. Handle only in closed system. During sampling, disconnecting lines or opening connections, an aluminized suit should be worn. Avoid with skin and eyes. Avoid incompatible materials (See Section 10).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Exposure controls

Ensure good ventilation and local exhaustion of the working area.

Personal protection

Respiratory

In case of insufficient ventilation wear suitable respiratory equipment (respirator with Filter A/p2).

Hand

Impervious gloves.

Eye

Safety glasses and a full face shield. A face shield is preferred over goggles.

Skin and body

Aluminised suit and protective boots (For further advice contact manufacturer).

8.2 Other information

Emergency-shower and facilities for rinsing eyes must be accessible. Launder clothes before reuse.

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9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Colour:	colourless
State:	liquid
Odour:	unpleasant
pH-Value:	n.a.
Viscosity:	0.7 mPas (30°C / 86°F)
Density (kg/ccm; 30°C):	1.198 kg/ccm (30°C / 86°F)
Boiling Point (1013 mbar):	118 °C / 244°F
Melting Point:	-30 °C / -22 °F
Flashpoint:	n.a.
Flammability:	Extremely flammable. Contact with water liberates extremely flammable gases.
Vapor Pressure (20°C):	21 mbar (20°C / 68°F)
Solubility in Water:	Reacts violently with water
Solubility in other solvents:	Miscible with saturated aliphatic and aromatic hydrocarbons
Non-Pyrophoric Limit:	
Non-Pyrophoric Limit:	23% in n-hexane
Non-Pyrophoric Limit:	31% in Heptane
Auto ignition temperature:	Spontaneously flammable in air.

10. STABILITY AND REACTIVITY

10.1 Conditions to avoid

In order to prevent thermal decomposition do not overheat (T > 70°C / 158°F exothermic). Local overheating and resulting thermal decomposition may cause the tank or cylinder to burst violently.

10.2 Materials to avoid

Avoid contact with moisture and water, alcohols, acids, organic halides and oxygen containing compounds.

10.3 Hazardous decomposition products

Products of complete combustion are carbon dioxide, water and aluminum oxide. Additionally, products of incomplete combustion may include carbon monoxide, elemental carbon and hydrocarbons (alkanes and alkenes).

10.4 Stability

Stable under recommended storage and handling conditions (see section 7).

10.5 Polymerization

Polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

Oral LD50 No data available

Skin corrosion/irritation

Corrosive

Serious eye damage/eye irritation

Corrosive: Risk of serious damages to eyes.

Respiratory or skin sensitisation

Corrosive

Genotoxicity

No data available

12. ECOLOGICAL INFORMATION

No experimental ecological data available on the substance as such.

13. DISPOSAL CONSIDERATIONS

13.1 Product

Refer to manufacturer/supplier for information on recovery/recycling. Waste disposal in accordance with regulations (most probably controlled incineration).

Contaminated packaging

According to local regulations. Emptied container might retain product residues. Follow all warnings even after the container is emptied. Do not wash residues into drains or other waterways.

Other information

For further advice contact manufacturer.

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14. TRANSPORT INFORMATION

ADR/RID 2015

GGVS/GGVE-class: 4.2 Sec Risc: 4.3
ADR/RID-class: 4.2
UN-no: 3394
Packaging group: I
Hazard Group: X333

IMDG ARNDT. 36-12

IMDG/GGVSee-class: 4.2 Sec Risc: 4.3
UN-no: 3394
Packaging group: I
EmS: F-G, S-M
Shipping Name: ORGANOMETALLIC SUBSTANCE, LIQUID,
PYROPHORIC, WATER-REACTIVE
(Diethylzinc)
Special Provision: 274

ICAO/IATA 2015

ICAO/IATA-class: 4.2 Sec Risc: 4.3
UN-no: 3394
Packaging Group: I
PAX-PIN: FORBIDDEN
CAO-PIN: FORBIDDEN

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

16. OTHER INFORMATION

DATE: 15.04.2015

Ensure operators understand the water-reactive and flammable nature of this product. Before using this product it is recommended that a risk assessment and safety study be carried out. The above mentioned information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Dockweiler Chemicals GmbH shall not be held liable for any damage resulting from handling or from contact with the above product.