

Safety Data Sheet

ELASTOCAST® TT331

Revision date : 2013/10/30
Version: 1.0

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(30593413/SDS_GEN_US/EN)

1. Product and Company Identification

Company
BASF CORPORATION
100 Park Avenue
Florham Park, NJ 07932, USA

24 Hour Emergency Response Information
CHEMTREC: 1-800-424-9300
BASF HOTLINE: 1-800-832-HELP (4357)

Chemical family: aromatic isocyanates
Synonyms: Diphenylmethane Diisocyanate

2. Hazards Identification

Emergency overview

WARNING:

CONTAINS DIPHENYLMETHANE DIISOCYANATE (CAS No. 101-68-8). INHALATION OF MDI MISTS OR VAPORS MAY CAUSE RESPIRATORY IRRITATION, BREATHLESSNESS, CHEST DISCOMFORT AND REDUCED PULMONARY FUNCTION. OVEREXPOSURE WELL ABOVE THE PEL MAY RESULT IN BRONCHITIS, BRONCHIAL SPASMS AND PULMONARY EDEMA. LONG-TERM EXPOSURE TO ISOCYANATES HAS BEEN REPORTED TO CAUSE LUNG DAMAGE, INCLUDING REDUCED LUNG FUNCTION WHICH MAY BE PERMANENT. ACUTE OR CHRONIC OVEREXPOSURE TO ISOCYANATES MAY CAUSE SENSITIZATION IN SOME INDIVIDUALS, RESULTING IN ALLERGIC RESPIRATORY REACTIONS INCLUDING WHEEZING, SHORTNESS OF BREATH AND DIFFICULTY BREATHING.

AVOID CONTACT WITH SKIN AND EYES.

SKIN OR EYE CONTACT MAY CAUSE IRRITATION.

ANIMAL TESTS AND OTHER RESEARCH INDICATE THAT SKIN CONTACT WITH MDI MAY PLAY A ROLE IN CAUSING RESPIRATORY SENSITIZATION.

State of matter: liquid

Colour: clear

Odour: slight odour

Potential health effects

Primary routes of exposure:

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

Acute toxicity:

Of moderate toxicity after short-term inhalation. Virtually nontoxic after a single ingestion. Virtually nontoxic after a single skin contact.

Inhalation of vapours may cause irritation of the mucous membranes of the nose, throat or trachea, breathlessness, chest discomfort, difficult breathing and reduced pulmonary function. Inhalation exposure well

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above the PEL may result additionally in eye irritation, headache, chemical bronchitis, asthma-like findings or pulmonary edema. Isocyanates have also been reported to cause hypersensitivity pneumonitis, which is characterized by flu-like symptoms, the onset of which may be delayed. Gastrointestinal symptoms include nausea, vomiting and abdominal pain.

Irritation / corrosion:

Irritating to eyes, respiratory system and skin.

Assessment other acute effects:

Causes temporary irritation of the respiratory tract.

Sensitization:

The substance may cause sensitization of the respiratory tract. Sensitization after skin contact possible. Studies in animals suggest that dermal exposure may lead to pulmonary sensitization. However, the relevance of this result for humans is unclear.

As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the PEL/TLV. These symptoms, which include chest tightness, wheezing, cough, shortness of breath, or asthmatic attack, could be immediate or delayed up to several hours after exposure. Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air, or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Chronic overexposure to isocyanates has also been reported to cause lung damage, including a decrease in lung function, which may be permanent. Prolonged contact can cause reddening, swelling, rash, scaling, or blistering. In those who have developed a skin sensitization, these symptoms can develop as a result of contact with very small amounts of liquid material, or even as a result of vapour-only exposure.

Chronic toxicity:

Carcinogenicity: A carcinogenic potential cannot be excluded after prolonged exposure to severely irritating concentrations. These effects are not relevant to humans at occupational levels of exposure.

Repeated dose toxicity: The substance may cause damage to the olfactory epithelium after repeated inhalation. These effects are not relevant to humans at occupational levels of exposure.

Reproductive toxicity: Repeated inhalative uptake of the substance did not cause damage to the reproductive organs.

Teratogenicity: The substance did not cause malformations in animal studies; however, toxicity to development was observed at high doses that were toxic to the parental animals.

Genotoxicity: The substance was mutagenic in various bacterial test systems; however, these results could not be confirmed in tests with mammals.

Medical conditions aggravated by overexposure:

The isocyanate component is a respiratory sensitizer. It may cause allergic reaction leading to asthma-like spasms of the bronchial tubes and difficulty in breathing. Medical supervision of all employees who handle or come into contact with isocyanates is recommended. Contact may aggravate pulmonary disorders. Persons with history of respiratory disease or hypersensitivity should not be exposed to this product. Preemployment and periodic medical examinations with respiratory function tests (FEV₁, FVC as a minimum) are suggested. Persons with asthmatic conditions, chronic bronchitis, other chronic respiratory diseases, recurrent eczema or pulmonary sensitization should be excluded from working with isocyanates. Once a person is diagnosed as having pulmonary sensitization (allergic asthma) to isocyanates, further exposure is not recommended.

Signs and symptoms of overexposure:

Eye irritation, skin irritation, allergic symptoms

Symptoms can appear later.

Information on: MDI

In sensitized individuals, sensitization reactions may be elicited by structurally similar substances. Respiratory sensitization may result in allergic (asthma-like) signs in the lower respiratory tract including wheezing, shortness of breath and difficulty breathing, the onset of which may be delayed. Repeated inhalation of high concentrations may cause lung damage, including reduced lung function, which may be permanent. Substances

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eliciting lower respiratory tract irritation may worsen the asthma-like reactions that may be produced by product exposures.

Potential environmental effects

Aquatic toxicity:

The product may hydrolyse. The test result maybe partially due to degradation products. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

3. Composition / Information on Ingredients

| <u>CAS Number</u> | <u>Content (W/W)</u> | <u>Chemical name</u> |
|-------------------|----------------------|--|
| 101-68-8 | < 90.0 % 12.0 % | Isocyanate Prepolymer Diphenylmethane-4,4'-diisocyanate (MDI) |

4. First-Aid Measures

General advice:

Remove contaminated clothing.

If inhaled:

Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary. Immediate medical attention required.

If on skin:

Wash affected areas thoroughly with soap and water. If irritation develops, seek medical attention.

If in eyes:

In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Immediate medical attention required.

If swallowed:

Rinse mouth and then drink plenty of water. Do not induce vomiting. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

Note to physician

Antidote: Specific antidotes or neutralizers to isocyanates do not exist.
Treatment: Treatment should be supportive and based on the judgement of the physician in response to the reaction of the patient.

5. Fire-Fighting Measures

| | | |
|----------------------------|-------------------------|--|
| Flash point: | > 200.00 °C | (open cup) |
| Autoignition: | > 470.00 °C | |
| Lower explosion limit: | | For liquids not relevant for classification and labelling. The lower explosion point may be 5 - 15 °C below the flash point. |
| Upper explosion limit: | | For liquids not relevant for classification and labelling. |
| Flammability: | Product is combustible. | |
| Self-ignition temperature: | | Based on its structural properties the product is not classified as self-igniting. |

Suitable extinguishing media:

water spray, dry powder, carbon dioxide, foam

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Hazards during fire-fighting:
nitrous gases, fumes/smoke, isocyanate, vapour

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

6. Accidental release measures

Personal precautions:
Clear area. Ensure adequate ventilation. Wear suitable personal protective clothing and equipment.

Environmental precautions:
Do not discharge into drains/surface waters/groundwater.

Cleanup:
Dike spillage.
For small amounts: Absorb isocyanate with suitable absorbent material (see § 40 CFR, sections 260, 264 and 265 for further information). Shovel into open container. Do not make container pressure tight. Move container to a well-ventilated area (outside). Spill area can be decontaminated with the following recommended decontamination solution: Mixture of 90 % water, 8 % concentrated ammonia, 2 % detergent. Add at a 10 to 1 ratio. Allow to stand for at least 48 hours to allow escape of evolved carbon dioxide.
For large amounts: If temporary control of isocyanate vapor is required, a blanket of protein foam or other suitable foam (available from most fire departments) may be placed over the spill. Transfer as much liquid as possible via pump or vacuum device into closed but not sealed containers for disposal.
For residues: The following measures should be taken for final cleanup: Wash down spill area with decontamination solution. Allow solution to stand for at least 10 minutes.

7. Handling and Storage

Handling

General advice:
If bulging of drum occurs, transfer to well ventilated area, puncture to relieve pressure, open vent and let stand for 48 hours before resealing.

Protection against fire and explosion:
No explosion proofing necessary.

Storage

General advice:
Formation of CO₂ and build up of pressure possible. Keep container tightly closed and in a well-ventilated place. Outage of containers should be filled with dry inert gas at atmospheric pressure to avoid reaction with moisture.

Storage incompatibility:
General advice: Segregate from bases.

Storage stability:
Storage temperature: 10 - 43 °C

8. Exposure Controls and Personal Protection

Components with occupational exposure limits

Diphenylmethane-4,4'-diisocyanate (MDI) OSHA PEL CLV 0.02 ppm 0.2 mg/m³ ;

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Advice on system design:

Provide local exhaust ventilation to maintain recommended P.E.L.

Personal protective equipment

Respiratory protection:

When workers are facing concentrations above the occupational exposure limits they must use appropriate certified respirators. When atmospheric levels may exceed the occupational exposure limit (PEL or TLV) NIOSH-certified air-purifying respirators equipped with an organic vapor sorbent and particulate filter can be used as long as appropriate precautions and change out schedules are in place. For emergency or non-routine, high exposure situations, including confined space entry, use a NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions.

Hand protection:

Chemical resistant protective gloves should be worn to prevent all skin contact., Suitable materials may include, chloroprene rubber (Neoprene), nitrile rubber (Buna N), chlorinated polyethylene, polyvinylchloride (Pylox), butyl rubber, depending upon conditions of use.

Eye protection:

Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:

Cover as much of the exposed skin as possible to prevent all skin contact., Suitable materials may include, saran-coated material, depending upon conditions of use.

General safety and hygiene measures:

Wear protective clothing as necessary to prevent contact. Eye wash fountains and safety showers must be easily accessible. Observe the appropriate PEL or TLV value. Wash soiled clothing immediately. Contaminated equipment or clothing should be cleaned after each use or disposed of.

9. Physical and Chemical Properties

| | | |
|---|---|--------------------|
| Form: | liquid | |
| Odour: | slight odour | |
| Colour: | clear | |
| pH value: | | not applicable |
| solidification temperature: | -10.00 °C | |
| Boiling point: | 200.00 °C | (500.000000 mmHg) |
| Vapour pressure: | < 0.01 mmHg | (25.00 °C) |
| Density: | 10.1700 lb/USg | (25.00 °C) |
| Vapour density: | | not applicable |
| Partitioning coefficient n-octanol/water (log Pow): | | Unspecified |
| Viscosity, dynamic: | 1,300.000 mPa.s | (80.00 °C) |
| Solubility in water: | | Reacts with water. |
| Miscibility with water: | | Reacts with water. |
| Other Information: | If necessary, information on other physical and chemical parameters is indicated in this section. | |

10. Stability and Reactivity

Conditions to avoid:

Avoid moisture.

Substances to avoid:

water, alcohols, strong bases, Substances/products that react with isocyanates.

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Hazardous reactions:

The product is chemically stable.
Reacts with water, with formation of carbon dioxide. Risk of bursting. Reacts with alcohols. Reacts with acids.
Reacts with alkalis. Reacts with amines. Risk of exothermic reaction. Risk of polymerization. Contact with certain rubbers and plastics can cause brittleness of the substance/product with subsequent loss in strength.

Decomposition products:

Hazardous decomposition products: carbon monoxide, hydrogen cyanide, nitrogen oxides, aromatic isocyanates, gases/vapours

Thermal decomposition:

No decomposition if stored and handled as prescribed/indicated.

Corrosion to metals:

No corrosive effect on metal.

Oxidizing properties:

Not an oxidizer.

11. Toxicological information

Acute toxicity

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)

Assessment of acute toxicity:

Of moderate toxicity after short-term inhalation. Virtually nontoxic after a single ingestion. Virtually nontoxic after a single skin contact.

Inhalation of vapours may cause irritation of the mucous membranes of the nose, throat or trachea, breathlessness, chest discomfort, difficult breathing and reduced pulmonary function. Inhalation exposure well above the PEL may result additionally in eye irritation, headache, chemical bronchitis, asthma-like findings or pulmonary edema. Isocyanates have also been reported to cause hypersensitivity pneumonitis, which is characterized by flu-like symptoms, the onset of which may be delayed. Gastrointestinal symptoms include nausea, vomiting and abdominal pain.

Oral:

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)

Type of value: LD50

Species: rat (male/female)

Value: > 2,000 mg/kg (Directive 84/449/EEC, B.1)

Inhalation:

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)

Type of value: LC10

Species: rat

Value: 2.24 mg/l (OECD Guideline 403)

Exposure time: 1 h

An aerosol was tested.

Dermal:

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)

Type of value: LD50

Species: rabbit (male/female)

Value: > 9,400 mg/kg

Irritation / corrosion

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Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Assessment of irritating effects:
Irritating to eyes, respiratory system and skin.

Skin:

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Species: rabbit
Result: Irritating.
Method: Draize test

Eye:

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Species: rabbit
Result: Irritating.
Method: Draize test

Sensitization

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Assessment of sensitization:
The substance may cause sensitization of the respiratory tract. Sensitization after skin contact possible. Studies in animals suggest that dermal exposure may lead to pulmonary sensitization. However, the relevance of this result for humans is unclear.
As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the PEL/TLV. These symptoms, which include chest tightness, wheezing, cough, shortness of breath, or asthmatic attack, could be immediate or delayed up to several hours after exposure. Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air, or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Chronic overexposure to isocyanates has also been reported to cause lung damage, including a decrease in lung function, which may be permanent. Prolonged contact can cause reddening, swelling, rash, scaling, or blistering. In those who have developed a skin sensitization, these symptoms can develop as a result of contact with very small amounts of liquid material, or even as a result of vapour-only exposure.

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Buehler test
Species: guinea pig
Result: sensitizing
Mouse Local Lymph Node Assay (LLNA)
Species: mouse
Result: sensitizing
Can cause skin sensitization
other
Species: guinea pig
Result: sensitizing
Studies in animals suggest that dermal exposure may lead to pulmonary sensitization. However, the relevance of this result for humans is unclear.

Repeated dose toxicity

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)
Assessment of repeated dose toxicity:
The substance may cause damage to the olfactory epithelium after repeated inhalation. These effects are not relevant to humans at occupational levels of exposure.

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Information on: Diphenylmethane-4,4'-diisocyanate (MDI)

Experimental/calculated data:

rat (Wistar) (male/female) Inhalation 2 yrs, 6 hr/day 0, 0.2, 1, 6 mg/m³, olfactory epithelium

NOAEL: 0.2 mg/m³

LOAEL: 1 mg/m³

The substance may cause damage to the olfactory epithelium after repeated inhalation. These effects are not relevant to humans at occupational levels of exposure. Repeated inhalative uptake of the substance did not cause damage to the reproductive organs.

, Lung

Genetic toxicity

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)

The substance was mutagenic in various bacterial test systems; however, these results could not be confirmed in tests with mammals.

Experimental/calculated data:

OECD Guideline 471 Ames-test Salmonella typhimurium:with and without metabolic activation ambiguous

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)

Experimental/calculated data:

OECD Guideline 471 Ames-test Salmonella typhimurium:with and without metabolic activation ambiguous

Experimental/calculated data:

OECD Guideline 474 Micronucleus assay rat (male) Inhalation negative

No clastogenic effect reported.

Carcinogenicity

Experimental/calculated data:

OECD Guideline 453 rat Inhalation 0, 0.2, 1, 6 mg/m³

Result: Lung tumors

A carcinogenic potential cannot be excluded after prolonged exposure to severely irritating concentrations. These effects are not relevant to humans at occupational levels of exposure.

Development

OECD Guideline 414 rat Inhalation 0, 1, 4, 12 mg/m³

NOAEL Mat.: 4 mg/m³

NOAEL Teratog.: 4 mg/m³

The substance did not cause malformations in animal studies; however, toxicity to development was observed at high doses that were toxic to the parental animals.

Aspiration Hazard:

No aspiration hazard expected.

12. Ecological Information

Aquatic toxicity

Information on: Diphenylmethane-4,4'-diisocyanate (MDI)

Assessment of aquatic toxicity:

The product may hydrolyse. The test result maybe partially due to degradation products. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Fish

Acute:

OECD Guideline 203 static

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Brachydanio rerio/LC0 (96 h): > 1,000 mg/l

Aquatic invertebrates

Acute:
OECD Guideline 202, part 1 static
Daphnia magna/EC50 (24 h): > 1,000 mg/l

Aquatic plants

Toxicity to aquatic plants:
OECD Guideline 201 static
green algae/EC0 (72 h): 1,640 mg/l

Microorganisms

Toxicity to microorganisms:
OECD Guideline 209 aquatic
aerobic bacteria from a domestic water treatment plant/EC50 (3 h): > 100 mg/l

Degradability / Persistence

Biological / Abiological Degradation

Test method: OECD Guideline 302 C (aerobic), activated sludge
Method of analysis: BOD of the ThOD
Degree of elimination: 0 % (28 d)
Evaluation: Poorly biodegradable.
Poorly biodegradable.
The product is unstable in water. The elimination data also refer to products of hydrolysis.

Hydrolysis

Test method: (abiotic)
Half-life: 20 h (25 °C)

Bioaccumulation

OECD Guideline 305 E
carp (28 d) Bioconcentration factor 200

13. Disposal considerations

Waste disposal of substance:

Incinerate or dispose of in a licensed facility. Do not discharge substance/product into sewer system.

Container disposal:

DRUMS:

Steel drums must be emptied and can be sent to a licensed drum reconditioner for reuse, a scrap metal dealer or an approved landfill. Do not attempt to refill or clean containers since residue is difficult to remove. Under no circumstances should empty drums be burned or cut open with gas or electric torch as toxic decomposition products may be liberated. Do not reuse empty containers.

14. Transport Information

Land transport

USDOT

Not classified as a dangerous good under transport regulations

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Sea transport

IMDG

Not classified as a dangerous good under transport regulations

Air transport

IATA/ICAO

Not classified as a dangerous good under transport regulations

Further information

DOT: This product is regulated if the amount in a single receptacle exceeds the Reportable Quantity (RQ). Please refer to Section 15 of this MSDS for the RQ for this product.

15. Regulatory Information

Federal Regulations

Registration status:

Chemical TSCA, US released / listed

OSHA hazard category: Chronic target organ effects reported; ACGIH TLV established

EPCRA 311/312 (Hazard categories): Not hazardous;

EPCRA 313:

| <u>CAS Number</u> | <u>Chemical name</u> |
|-------------------|---|
| 101-68-8 | Diphenylmethane-4,4'-diisocyanate (MDI) |

| <u>CERCLA RQ</u> | <u>CAS Number</u> | <u>Chemical name</u> |
|------------------|-------------------|---|
| 5000 LBS | 101-68-8 | Diphenylmethane-4,4'-diisocyanate (MDI) |

State regulations

| <u>State RTK</u> | <u>CAS Number</u> | <u>Chemical name</u> |
|------------------|-------------------|---|
| MA, NJ, PA | 101-68-8 | Diphenylmethane-4,4'-diisocyanate (MDI) |

16. Other Information

NFPA Hazard codes:

Health : 2 Fire: 1 Reactivity: 1 Special:

HMIS III rating

Health: 2^a Flammability: 1 Physical hazard: 1

NFPA and HMIS use a numbering scale ranging from 0 to 4 to indicate the degree of hazard. A value of zero means that the substance possesses essentially no hazard; a rating of four indicates extreme danger. Although similar, the two rating systems are intended for different purposes, and use different criteria. The NFPA system was developed to provide an on-the-spot alert to the hazards of a material, and their severity, to emergency responders. The HMIS system was designed to communicate workplace hazard information to employees who handle hazardous chemicals.

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our

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products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

SDS Prepared by:

BASF NA Product Regulations

msds@basf.com

SDS Prepared on: 2013/10/30

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END OF DATA SHEET

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1-22-14

Date, Signature

Dave Mill