

MarvelShield Extreme Abrasion M391

Technical Data Sheet



Product Description:

MarvelShield Extreme Abrasion is a 100% solids, 100% polyurea coating designed for use as a highly abrasive elastomeric coating or topcoat. Designed for a multitude of applications due to its combination of hardness and tensile strength, this 100% polyurea bonds well to all substrates but works best in applications with steel and concrete.

Ideal for:

- Metal tanks
- Concrete tunnels
- Cargo trailers
- Earth-moving equipment
- Tank linings/well pad accessories
- Flooring

Applications:

MarvelShield Extreme Abrasion. It is designed for applications where the substrate is subjected to a heavy workload such as foot traffic, daily loading and unloading, and anywhere extreme strength is needed.

Substrate Preparation:

For information on how to properly prepare a metal substrate, refer to **Marvel Coatings Specification for Application of Polyurea to Steel or Non-Ferrous Metal Substrates**. For information on how to properly prepare a concrete substrate, refer to **Marvel Coatings Specification for Application of Polyurea to Concrete Substrates**. For information on how to properly prepare anything else, refer to **Marvel Coatings Specification for Application of Polyurea to Fabric, Organic, and Miscellaneous Substrates**.

Storage and Handling:

Containers for both isocyanate and resin (components A and B) components should be kept tightly closed to prevent moisture contamination. Do not reseal if contamination is suspected. Component B may be stored at ambient temperatures. Storage for Component A should be maintained between 77°F (25°C) and 95°F (35°C). For best results, this product should not be allowed to freeze, although it may be re-heated in a well ventilated oven for a period of time to re-liquefy solid particles. To avoid product degradation, product temperature during re-heating should not exceed 140°F (60°C). Exposure to temperatures over 400°F (204°C) can create excessive pressure potentially causing containers to rupture. Do not breathe aerosol or vapors and avoid contact with skin and eyes. Exposure to vapors of heated MDI can be dangerous. To heat product properly, use well ventilated convection ovens or other methods that distribute heat evenly. Avoid using drum heaters or other heat sources that may cause excessive local heating.

Health and Safety Information:

Refer to this product's Material Safety Data Sheet (MSDS) which provides information concerning the health and safety precautions that must be observed when handling any of the products listed above. Before working with these products, it is the user's responsibility to read and become familiar with the available information on its hazards, proper use and handling.

Consistent Testing and Maturation:

Our coatings are subjected to continuous physical property testing in an effort to continuously improve based on real data from field application. Please contact your Marvel Industrial Coatings representative for more information concerning upcoming or recent tests. Please note that application method, substrate preparation, and testing equipment and processes do have a large effect on the physical capabilities and strengths of the products.

Typical Physical Properties		
Hardness, ASTM D-2240	Shore A	100
Hardness, ASTM D-2240	Shore D	61
Elongation, 25° C, ASTM D-412	%	150
Tensile Strength 25° C, ASTM D-412	PSI	3,727
Die C Tear Strength, ASTM D-624	PLI	697
Abrasion Wheel C-17 / 1000 cycles	mg loss	0.90
Theoretical coverage @ 62.5 mils (1.6 mm)	25 ft²/gal	
Theoretical coverage @ 125 mils (3.2 mm)	13 ft²/gal	
Application Requirements		
Application Method	high pressure machine	
Minimum Temperature	°F	150
Minimum Working Pressure	PSI	2,500
Minimum Mix Time	min	25
Recoat Window	hours	12
Processing Characteristics		
Solids by Weight and Volume	%	100
Mix Ratio by Volume	1:1	
Gel-Free Time	sec	15
Tack-Free Time	sec	28
Typical Properties A Side (ISO)		
Viscosity @ 25° C	mPa·s	800 - 1,000
Specific Gravity @ 25° C	1.10	
Weight @ 25° C	lbs/gal	9.17
Appearance @ 25°C:	viscous liquid	
Typical Properties B Side (Resin)		
Viscosity @ 25° C	mPa·s	500 - 800
Specific Gravity @ 25°C:	1.02	
Weight @ 25° C	lbs/gal	8.51
Appearance @ 25°C:	viscous liquid	

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Warranty:

The information herein is believed to be accurate and reliable as of the date of issuance, but is subject to change without prior notice. It is up to the User to contact Marvel Industrial Coatings, LLC. to verify the correctness prior to ordering or specifying this product. Marvel Industrial Coatings, LLC. warrants this product for merchantable quality only, does not warranty against unknown risks that may or may not be present, nor do we assume any responsibility for coverage, performance, or injuries resulting from the use of this product. **No other warranty or guarantee of any kind is made by Marvel Industrial Coatings, LLC. expressed or implied, statutory, by operation or law, or otherwise, including marketability and fitness for a particular purpose.** Failure to strictly adhere to recommended procedures shall relieve Marvel Industrial Coatings, LLC. of all liability with respect to the product or the use thereof. The buyer assumes all risks whatsoever as to the use of these products and the Buyer's exclusive remedy as to any breach of warranty or negligence claim shall be limited to the purchase price of the materials and agrees that any and all litigation proceedings shall be according to the laws of Texas and shall be filed in the County of Harris, TX. Each person, firm, or corporation engaged in the application installation, disposal or any other use of the any of these products shall carefully determine whether there is a potential hazard associated with such product in a specific usage, and utilize all appropriate precautionary and safety measures as outlined in Local, State and Federal regulations governing the use or disposal of these products or the construction and/or renovation of structures.



Safety Data Sheet

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1. Identification

Product identifier used on the label

MARVELSHIELD 391 RESIN BLACK

Recommended use of the chemical and restriction on use

Recommended use*: polyurethane component; industrial chemicals
Suitable for use in industrial sector: Polymers industry; chemical industry

* The "Recommended use" identified for this product is provided solely to comply with a Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:

Marvel Industrial Coatings, LLC
6309 Skyline Dr. Suite B
Houston, Tx 77057 USA

Telephone: +1 713 784-2910

Emergency telephone number

CHEMTREC: 1-800-424-9300

Other means of identification

Synonyms: Urethane System Resin Component

2. Hazards Identification

According to Regulation 2012 OSHA Hazard Communication Standard: 29 CFR Part 1910.1200

Classification of the product

Acute Tox.	4 (oral)	Acute toxicity
Skin Corr./Irrit.	1A	Skin corrosion/irritation
Eye Dam./Irrit.	1	Serious eye damage/eye irritation
STOT RE	2 (oral)	Specific target organ toxicity — repeated exposure
Aquatic Acute	2	Hazardous to the aquatic environment - acute
Aquatic Chronic	2	Hazardous to the aquatic environment - chronic

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Label elements

Pictogram:



Signal Word:

Danger

Hazard Statement:

H302	Harmful if swallowed.
H373	May cause damage to organs (Pancreas) through prolonged or repeated exposure (oral).
H314	Causes severe skin burns and eye damage.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements (Prevention):

P280	Wear protective gloves/protective clothing/eye protection/face protection.
P273	Avoid release to the environment.
P260	Do not breathe dust/gas/mist/vapours.
P270	Do not eat, drink or smoke when using this product.
P264	Wash with plenty of water and soap thoroughly after handling.

Precautionary Statements (Response):

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.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P301 + P330 + P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P391	Collect spillage.

Precautionary Statements (Storage):

P405	Store locked up.
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Precautionary Statements (Disposal):

P501	Dispose of contents/container to hazardous or special waste collection point.
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Hazards not otherwise classified

No specific dangers known, if the regulations/notes for storage and handling are considered.

3. Composition / Information on Ingredients

According to Regulation 2012 OSHA Hazard Communication Standard: 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Weight %</u>	<u>Chemical name</u>
9046-10-0	>= 25.0 - < 50.0%	alpha-(2-Aminomethylethyl)-omega-(2-aminomethylethoxy)- poly(oxy(methyl-1,2-ethanediyl))
68479-98-1	>= 20.0 - < 25.0%	diethylmethylbenzenediamine

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64852-22-8	>= 10.0 - < 15.0%	Poly[oxy(methyl-1,2-ethanediyl)], .alpha.,.alpha.',.alpha."-1,2,3-propanetriyltris[.omega.-(2-aminomethylethoxy)-carbon black
1333-86-4	>= 0.3 - < 1.0%	

4. First-Aid Measures

Description of first aid measures

General advice:

First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:

Keep patient calm, remove to fresh air, seek medical attention. Immediately administer a corticosteroid from a controlled/metered dose inhaler.

If on skin:

Immediately wash thoroughly with plenty of water, apply sterile dressings, consult a skin specialist.

If in eyes:

Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

If swallowed:

Do not induce vomiting. Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11.

Hazards: No hazards anticipated.

Indication of any immediate medical attention and special treatment needed

Note to physician

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
water spray, dry powder, carbon dioxide, foam

Special hazards arising from the substance or mixture

Hazards during fire-fighting:
No particular hazards known.

Advice for fire-fighters

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Protective equipment for fire-fighting:

Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:

Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

6. Accidental release measures

Further accidental release measures:

High risk of slipping due to leakage/spillage of product.

Personal precautions, protective equipment and emergency procedures

Use personal protective clothing.

Environmental precautions

Do not empty into drains. Do not discharge into the subsoil/soil.

Methods and material for containment and cleaning up

Spills should be contained, solidified, and placed in suitable containers for disposal.

7. Handling and Storage

Precautions for safe handling

Ensure thorough ventilation of stores and work areas. Protect against moisture.

Protection against fire and explosion:

No explosion proofing necessary.

Conditions for safe storage, including any incompatibilities

Segregate from foods and animal feeds. Segregate from acids. Segregate from oxidants.

Suitable materials for containers: Carbon steel (Iron), High density polyethylene (HDPE), Low density polyethylene (LDPE), Stainless steel 1.4301 (V2)

Further information on storage conditions: No special precautions necessary. Avoid extreme heat. Store protected against freezing.

Storage stability:

Storage temperature: 60 - 80 °F

Protect against moisture.

The stated storage temperature is noted for health and safety in the workplace. With regard to Quality, please refer to the product specific Technical Bulletin.

8. Exposure Controls/Personal Protection

Components with occupational exposure limits

carbon black	OSHA PEL	PEL 3.5 mg/m3 ; TWA value 3.5 mg/m3 ;
	ACGIH TLV	TWA value 3 mg/m3 Inhalable fraction ;

Advice on system design:

Provide local exhaust ventilation to control vapours/mists.

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Personal protective equipment

Respiratory protection:

Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator as needed.

Hand protection:

Chemical resistant protective gloves

Eye protection:

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

Body protection:

Standard work clothes and shoes.

General safety and hygiene measures:

Avoid contact with skin. Handle in accordance with good industrial hygiene and safety practice. Wear protective clothing as necessary to prevent contact. Avoid inhalation of vapours/mists. Wash soiled clothing immediately.

9. Physical and Chemical Properties

Form:	liquid	
Odour:	amine-like	
Odour threshold:	No applicable information available.	
Colour:	black	
pH value:	7.0	
Melting point:	-29.00 °C	
Boiling point:	> 250.00 °C	
Sublimation point:	No applicable information available.	
Flash point:	> 94.00 °C	(closed cup)
Flammability:	not flammable	
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.	
Autoignition:	> 250 °C	
Vapour pressure:	0.01 mmHg (25.00 °C)	
Density:	1.0200 g/cm3 (20.00 °C)	
Relative density:	No applicable information available.	
Vapour density:	No applicable information available.	
Partitioning coefficient n-octanol/water (log Pow):	No applicable information available.	
Self-ignition temperature:	not self-igniting	
Thermal decomposition:	No decomposition if stored and handled as prescribed/indicated.	
Viscosity, dynamic:	800.000 mPa.s (25.00 °C)	
Viscosity, kinematic:	No applicable information available.	
Solubility in water:	slightly soluble	
Solubility (quantitative):	No applicable information available.	
Solubility (qualitative):	No applicable information available.	

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Evaporation rate:	Value can be approximated from Henry's Law Constant or vapor pressure.
Other Information:	If necessary, information on other physical and chemical parameters is indicated in this section.

10. Stability and Reactivity

Reactivity

No hazardous reactions if stored and handled as prescribed/indicated.

Corrosion to metals:
No corrosive effect on metal.

Oxidizing properties:
Not an oxidizer.

Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions

No hazardous reactions if stored and handled as prescribed/indicated.

Conditions to avoid

Temperature: < 0 degrees Celsius

Incompatible materials

acids, oxidizing agents, isocyanates

Hazardous decomposition products

Decomposition products:
Hazardous decomposition products: carbon monoxide, carbon dioxide, nitrogen oxide, hydrogen cyanide

Thermal decomposition:
No decomposition if stored and handled as prescribed/indicated.

11. Toxicological information

Primary routes of exposure

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

Acute Toxicity/Effects

Acute toxicity

Assessment of acute toxicity: Of moderate toxicity after single ingestion.

Oral

Type of value: ATE
Value: 344 mg/kg

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The product has not been tested. The statement has been derived from the properties of the individual components.

Information on: diethylmethylbenzenediamine

Type of value: LD50

Species: rat (female)

Value: 472 mg/kg (OECD Guideline 401)

The European Union (EU) has classified this substance as 'harmful'.

Information on: Poly[oxy(methyl-1,2-ethanediyl)], .alpha.,.alpha.',.alpha."-1,2,3-propanetriyltris[.omega.-(2-aminomethylethoxy)-

Type of value: LD50

Species: rat

Value: > 50 - < 200 mg/kg (OECD Guideline 423)

The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Inhalation

No applicable information available.

Dermal

No applicable information available.

Assessment other acute effects

Assessment of STOT single:

Based on the available information there is no specific target organ toxicity to be expected after a single exposure.

Origin of data: expert judgement

Irritation / corrosion

Assessment of irritating effects: Corrosive! Damages skin and eyes. May cause severe damage to the eyes.

Information on: alpha-(2-Aminomethylethyl)-omega-(2-aminomethylethoxy)- poly(oxy(methyl-1,2-ethanediyl))

Assessment of irritating effects: Corrosive! Damages skin and eyes.

Information on: diethylmethylbenzenediamine

Assessment of irritating effects: Eye contact causes irritation. Not irritating to the skin. The European Union (EU) has classified the substance as "irritating" to eyes.

Information on: Poly[oxy(methyl-1,2-ethanediyl)], .alpha.,.alpha.',.alpha."-1,2,3-propanetriyltris[.omega.-(2-aminomethylethoxy)-

Assessment of irritating effects: Skin contact causes irritation. May cause severe damage to the eyes.

Sensitization

Assessment of sensitization: The chemical structure does not suggest a sensitizing effect. No applicable information available.

Aspiration Hazard

No aspiration hazard expected.

Chronic Toxicity/Effects

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Repeated dose toxicity

Assessment of repeated dose toxicity: Repeated exposure may affect certain organs.

Information on: diethylmethylbenzenediamine

Assessment of repeated dose toxicity: EU-classification Repeated oral exposure may affect certain organs.

Genetic toxicity

Assessment of mutagenicity: The chemical structure does not suggest a specific alert for such an effect. No applicable information available.

Carcinogenicity

Information on: carbon black

Assessment of carcinogenicity: IARC (International Agency for Research on Cancer) has classified this substance as group 2B (The agent is possibly carcinogenic to humans). In long-term animal studies in which the substance was given by inhalation in high concentrations, a carcinogenic effect was observed. A clear indication of an increased risk of cancer in humans has so far not been shown. No carcinogenic potential can be deduced from other studies with rats and mice.

Reproductive toxicity

Assessment of reproduction toxicity: The chemical structure does not suggest a specific alert for such an effect. No applicable information available.

Teratogenicity

Assessment of teratogenicity: The chemical structure does not suggest a specific alert for such an effect. No applicable information available.

Other Information

The product has not been tested. The statement has been derived from the properties of the individual components.

Symptoms of Exposure

The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11.

Medical conditions aggravated by overexposure

Data available do not indicate that there are medical conditions that are generally recognized as being aggravated by exposure to this substance/product.

12. Ecological Information

Toxicity

Aquatic toxicity

Assessment of aquatic toxicity:

Acutely toxic for aquatic organisms. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product has not been tested. The statement has been derived from the properties of the individual components.

Toxicity to fish

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Information on: *alpha*-(2-Aminomethylethyl)-*omega*-(2-aminomethylethoxy)- poly(oxy(methyl-1,2-ethanediyl))
LC50 (96 h) > 15 mg/l, *Oncorhynchus mykiss* (OECD Guideline 203, semistatic)
The details of the toxic effect relate to the nominal concentration. Limit concentration test only (LIMIT test).
LC50 (96 h) 772.14 mg/l, *Cyprinodon variegatus* (OECD Guideline 203, static)
The details of the toxic effect relate to the nominal concentration.

Information on: diethylmethylbenzenediamine
LC50 (96 h) 194 mg/l, *Leuciscus idus* (DIN 38412 Part 15, static)

Information on: Poly[oxy(methyl-1,2-ethanediyl)], .*alpha*.,.*alpha*.,.*alpha*."-1,2,3-propanetriyltris[*omega*-(2-aminomethylethoxy)-
LC50 (96 h) > 100 mg/l, *Oncorhynchus mykiss* (OECD 203; ISO 7346; 84/449/EEC, C.1, static)
The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Aquatic invertebrates

Information on: *alpha*-(2-Aminomethylethyl)-*omega*-(2-aminomethylethoxy)- poly(oxy(methyl-1,2-ethanediyl))
EC50 (48 h) 80 mg/l, *Daphnia magna* (OECD Guideline 202, part 1, static)
The details of the toxic effect relate to the nominal concentration.
EC50 (48 h) 418.34 mg/l, *Acartia tonsa* (Daphnia test acute, static)
The details of the toxic effect relate to the nominal concentration.

Information on: diethylmethylbenzenediamine
EC50 (48 h) 0.5 mg/l, *Daphnia magna* (Daphnia test acute)

Information on: Poly[oxy(methyl-1,2-ethanediyl)], .*alpha*.,.*alpha*.,.*alpha*."-1,2,3-propanetriyltris[*omega*-(2-aminomethylethoxy)-
EC50 (48 h) 13.0 mg/l, *Daphnia magna* (OECD Guideline 202, part 1, static)
Nominal values (confirmed by concentration control analytics) The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Aquatic plants

Information on: *alpha*-(2-Aminomethylethyl)-*omega*-(2-aminomethylethoxy)- poly(oxy(methyl-1,2-ethanediyl))
EC50 (72 h) 15 mg/l (growth rate), *Pseudokirchneriella subcapitata* (OECD Guideline 201, static)
The details of the toxic effect relate to the nominal concentration.
No observed effect concentration (72 h) 0.32 mg/l (growth rate), *Pseudokirchneriella subcapitata* (OECD Guideline 201, static)
The details of the toxic effect relate to the nominal concentration.
EC50 (72 h) 141.72 mg/l, *Skeletonema costatum* (ISO/DIS 10253, static)
The details of the toxic effect relate to the nominal concentration.
No observed effect concentration (72 h) 100 mg/l, *Skeletonema costatum* (ISO/DIS 10253, static)
The details of the toxic effect relate to the nominal concentration.

Information on: diethylmethylbenzenediamine
EC50 (72 h) 104 mg/l (growth rate), *Desmodesmus subspicatus* (OECD Guideline 201, static)

Information on: Poly[oxy(methyl-1,2-ethanediyl)], .*alpha*.,.*alpha*.,.*alpha*."-1,2,3-propanetriyltris[*omega*-(2-aminomethylethoxy)-
EC50 (72 h) 4.4 mg/l (growth rate), *Pseudokirchneriella subcapitata* (OECD Guideline 201, static)

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The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

No observed effect concentration (72 h) 1 mg/l (growth rate), Pseudokirchneriella subcapitata (OECD Guideline 201, static)

The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Chronic toxicity to fish

Information on: alpha-(2-Aminomethylethyl)-omega-(2-aminomethylethoxy)- poly(oxy(methyl-1,2-ethanediyl))

Study does not need to be conducted.

Information on: Poly[oxy(methyl-1,2-ethanediyl)], .alpha.,.alpha.',.alpha."-1,2,3-propanetriyltris[.omega.-(2-aminomethylethoxy)-

Chronic toxicity to aquatic invertebrates

Information on: alpha-(2-Aminomethylethyl)-omega-(2-aminomethylethoxy)- poly(oxy(methyl-1,2-ethanediyl))

Study does not need to be conducted.

Information on: Poly[oxy(methyl-1,2-ethanediyl)], .alpha.,.alpha.',.alpha."-1,2,3-propanetriyltris[.omega.-(2-aminomethylethoxy)-

Microorganisms/Effect on activated sludge

Toxicity to microorganisms

Information on: alpha-(2-Aminomethylethyl)-omega-(2-aminomethylethoxy)- poly(oxy(methyl-1,2-ethanediyl))

OECD Guideline 209 aerobic

activated sludge of a predominantly domestic sewage/EC20 (3 h): 380 mg/l

The details of the toxic effect relate to the nominal concentration.

Information on: diethylmethylbenzenediamine

Bringmann-Kuehn Test static

bacterium/EC10 (24 h): 170 mg/l

Information on: Poly[oxy(methyl-1,2-ethanediyl)], .alpha.,.alpha.',.alpha."-1,2,3-propanetriyltris[.omega.-(2-aminomethylethoxy)-

OECD Guideline 209 aerobic

activated sludge, domestic/EC20 (30 min): approx. 130 mg/l

The details of the toxic effect relate to the nominal concentration. The product has not been tested.

The statement has been derived from substances/products of a similar structure or composition.

Persistence and degradability

Assessment biodegradation and elimination (H2O)

Poorly biodegradable.

Elimination information

Poorly biodegradable.

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Bioaccumulative potential

Assessment bioaccumulation potential

Does not significantly accumulate in organisms.

Mobility in soil

Assessment transport between environmental compartments

Adsorption to solid soil phase is not expected.

Additional information

Adsorbable organically-bound halogen (AOX):

This product contains no organically-bound halogen.

Other ecotoxicological advice:

The product has not been tested. Do not discharge product into the environment without control.

13. Disposal considerations

Waste disposal of substance:

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

Container disposal:

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

Hazard class:	8
Packing group:	II
ID number:	UN 2735
Hazard label:	8
Proper shipping name:	AMINES, LIQUID, CORROSIVE, N.O.S. (contains POLYETHERDIAMINE)

Sea transport

IMDG

Hazard class:	8
Packing group:	II
ID number:	UN 2735
Hazard label:	8
Marine pollutant:	NO
Proper shipping name:	AMINES, LIQUID, CORROSIVE, N.O.S. (contains POLYETHERDIAMINE)

Air transport

IATA/ICAO

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Hazard class: 8
Packing group: II
ID number: UN 2735
Hazard label: 8
Proper shipping name: AMINES, LIQUID, CORROSIVE, N.O.S. (contains POLYETHERDIAMINE)

15. Regulatory Information

Federal Regulations

Registration status:

Chemical TSCA, US released / listed

EPCRA 311/312 (Hazard categories): Acute; Chronic

State regulations

<u>State RTK</u>	<u>CAS Number</u>	<u>Chemical name</u>
PA	1333-86-4	carbon black
MA	1333-86-4	carbon black
NJ	1333-86-4	carbon black

CA Prop. 65:

WARNING: THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

NFPA Hazard codes:

Health : 3 Fire: 1 Reactivity: 1 Special:

HMIS III rating

Health: 3a Flammability: 1 Physical hazard: 1

16. Other Information

SDS Prepared by:

Marvel Industrial Coatings Product

Regulations

SDS Prepared on: 2016/06/02

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END OF DATA SHEET



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1. Identification

Product identifier used on the label

MARVELSHIELD* 391

Recommended use of the chemical and restriction on use

Recommended use*: polyurethane component; industrial chemicals

Suitable for use in industrial sector: Polymers industry; chemical industry

* The "Recommended use" identified for this product is provided solely to comply with a Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:

Marvel Industrial Coatings, LLC
6309 Skyline Dr. Suite B
Houston, Tx 77057 USA

Telephone: +1 713 784-2910

Emergency telephone number

CHEMTREC: 1-800-424-9300

Other means of identification

Chemical family: aromatic isocyanates

Synonyms: Diphenylmethane Diisocyanate

2. Hazards Identification

According to Regulation 2012 OSHA Hazard Communication Standard: 29 CFR Part 1910.1200

Classification of the product

Acute Tox.	4 (Inhalation - mist)	Acute toxicity
Eye Dam./Irrit.	2B	Serious eye damage/eye irritation
Skin Corr./Irrit.	2	Skin corrosion/irritation
Skin Sens.	1B	Skin sensitization
Resp. Sens.	1	Respiratory sensitization
STOT SE	3 (irritating to respiratory system)	Specific target organ toxicity — single exposure

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STOT RE	2 (by inhalation)	Specific target organ toxicity — repeated exposure
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Label elements

Pictogram:



Signal Word:
Danger

Hazard Statement:

H320	Causes eye irritation.
H315	Causes skin irritation.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317	May cause an allergic skin reaction.
H335	May cause respiratory irritation.
H373	May cause damage to organs (Olfactory organs) through prolonged or repeated exposure (inhalation).

Precautionary Statements (Prevention):

P280	Wear protective gloves.
P271	Use only outdoors or in a well-ventilated area.
P260	Do not breathe dust/gas/mist/vapours.
P261	Avoid breathing mist.
P284	In case of inadequate ventilation wear respiratory protection.
P272	Contaminated work clothing should not be allowed out of the workplace.
P264	Wash with plenty of water and soap thoroughly after handling.

Precautionary Statements (Response):

P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P314	Get medical advice/attention if you feel unwell.
P303 + P352	IF ON SKIN (or hair): Wash with plenty of soap and water.
P333 + P311	If skin irritation or rash occurs: Call a POISON CENTER or doctor/physician.
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P362 + P364	Take off contaminated clothing and wash it before reuse.
P337 + P311	If eye irritation persists: Call a POISON CENTER or doctor/physician.

Precautionary Statements (Storage):

P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Precautionary Statements (Disposal):

P501	Dispose of contents/container to hazardous or special waste collection point.
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Hazards not otherwise classified

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No specific dangers known, if the regulations/notes for storage and handling are considered.

Labeling of special preparations (GHS):

CONTAINS ISOCYANATES. INHALATION OF ISOCYANATE 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. ANIMAL TESTS INDICATE THAT SKIN CONTACT MAY PLAY A ROLE IN CAUSING RESPIRATORY SENSITIZATION.

According to Regulation 1994 OSHA Hazard Communication Standard: 29 CFR Part 1910.1200

Emergency overview

WARNING:

CONTAINS ISOCYANATES. INHALATION OF ISOCYANATE 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. ANIMAL TESTS INDICATE THAT SKIN CONTACT MAY PLAY A ROLE IN CAUSING RESPIRATORY SENSITIZATION.
AVOID CONTACT WITH SKIN AND EYES.
SKIN OR EYE CONTACT MAY CAUSE IRRITATION.

3. Composition / Information on Ingredients

According to Regulation 2012 OSHA Hazard Communication Standard: 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Weight %</u>	<u>Chemical name</u>
101-68-8	>= 25.0 - < 50.0%	Diphenylmethane-4,4'-diisocyanate (MDI)
26447-40-5	>= 1.0 - < 3.0%	Methylenediphenyl diisocyanate
25686-28-6	>= 15.0 - < 20.0%	(OLIGOMER) 4,4'-Methylenediphenyl diisocyanate, oligomers

According to Regulation 1994 OSHA Hazard Communication Standard: 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Weight %</u>	<u>Chemical name</u>
101-68-8	< 45.0%	Diphenylmethane-4,4'-diisocyanate (MDI)
	< 40.0%	Isocyanate Prepolymer
26447-40-5	< 5.0%	Methylenediphenyl diisocyanate
25686-28-6	< 20.0%	(OLIGOMER) 4,4'-Methylenediphenyl diisocyanate, oligomers

4. First-Aid Measures

Description of first aid measures

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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.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Eye irritation, skin irritation, allergic symptoms

Hazards: Symptoms can appear later.

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

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

Indication of any immediate medical attention and special treatment needed

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

Extinguishing media

Suitable extinguishing media:
water spray, dry powder, carbon dioxide, foam

Special hazards arising from the substance or mixture

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

Advice for fire-fighters

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

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Further information:

Keep containers cool by spraying with water if exposed to fire. Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

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

Environmental precautions

Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up

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.

Dike spillage.

7. Handling and Storage

Precautions for safe handling

Provide suitable exhaust ventilation at the processing machines. Ensure thorough ventilation of stores and work areas. Avoid aerosol formation. When handling heated product, vapours of the product should be ventilated, and respiratory protection used. Wear respiratory protection when spraying. Danger of bursting when sealed gastight. Protect against moisture. 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.

Conditions for safe storage, including any incompatibilities

Keep away from water. Segregate from foods and animal feeds. Segregate from acids and bases. Segregate from bases.

Suitable materials for containers: Carbon steel (Iron), High density polyethylene (HDPE), Low density polyethylene (LDPE), Stainless steel 1.4301 (V2)

Further information on storage conditions: 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 stability:

Storage temperature: 18 - 29 °C

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8. Exposure Controls/Personal Protection

Components with occupational exposure limits

Diphenylmethane-4,4'-diisocyanate (MDI)	OSHA PEL	CLV 0.02 ppm 0.2 mg/m ³ ; CLV 0.02 ppm 0.2 mg/m ³ ;
	ACGIH TLV	TWA value 0.005 ppm ;

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, musty	
Odour threshold:	not applicable	
Colour:	yellow, clear	
pH value:	not applicable	
Freezing point:	-8.00 °C	
Boiling point:	200.00 °C (5.000000 mmHg)	
Sublimation point:	No applicable information available.	
Flash point:	135.00 °C	(closed cup)
Flammability:	not flammable	
Lower explosion limit:	4.70 %(V)	
Upper explosion limit:	21.00 %(V)	
Autoignition:	> 250 °C	
Vapour pressure:	0.00001 mmHg (25.00 °C)	

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Density:	9.7500 lb/USg (25.00 °C)
Relative density:	No applicable information available.
Vapour density:	not applicable
Partitioning coefficient n-octanol/water (log Pow):	Unspecified
Self-ignition temperature:	Based on its structural properties the product is not classified as self-igniting.
Thermal decomposition:	No decomposition if stored and handled as prescribed/indicated.
Viscosity, dynamic:	750.000 mPa.s (25.00 °C)
Viscosity, kinematic:	No applicable information available.
Solubility in water:	Reacts with water.
Miscibility with water:	Reacts with water.
Solubility (quantitative):	No applicable information available.
Solubility (qualitative):	No applicable information available.
Evaporation rate:	Value can be approximated from Henry's Law Constant or vapor pressure.
Other Information:	If necessary, information on other physical and chemical parameters is indicated in this section.

10. Stability and Reactivity

Reactivity

Corrosion to metals:
No corrosive effect on metal.

Oxidizing properties:
Not an oxidizer.

Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions

Reacts with water, with formation of carbon dioxide. Risk of bursting. Reacts with alcohols. Reacts with acids. Reacts with alkalies. 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.

Conditions to avoid

Avoid moisture.

Incompatible materials

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

Hazardous decomposition products

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

Thermal decomposition:

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No decomposition if stored and handled as prescribed/indicated.

11. Toxicological information

Primary routes of exposure

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

Acute Toxicity/Effects

Acute toxicity

Assessment of acute toxicity: 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.

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

Type of value: LC50

Species: rat (male/female)

Value: 2.0 mg/l (OECD Guideline 403)

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

Assessment other acute effects

Assessment of STOT single:

Causes temporary irritation of the respiratory tract.

Irritation / corrosion

Assessment of irritating effects: Irritating to eyes, respiratory system and skin. Skin contact may result in dermatitis, either irritative or allergic.

Skin

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

Species: rabbit

Result: Irritating.

Method: Draize test

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Eye

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

Sensitization

Assessment of sensitization: Sensitization after skin contact possible. The substance may cause sensitization of the respiratory tract. 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. Animal tests indicate that skin contact may play a role in causing respiratory sensitization.

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.

Aspiration Hazard

No aspiration hazard expected.

Chronic Toxicity/Effects

Repeated dose toxicity

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

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

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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.

Genetic toxicity

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

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

Genetic toxicity in vitro: OECD Guideline 471 Ames-test Salmonella typhimurium: with and without metabolic activation ambiguous

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

Genetic toxicity in vivo: OECD Guideline 474 Micronucleus assay rat (male) Inhalation negative No clastogenic effect reported.

Carcinogenicity

Assessment of 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. IARC Group 3 (not classifiable as to human carcinogenicity).

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

Assessment of 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. IARC Group 3 (not classifiable as to human carcinogenicity).

Information on: Methylenediphenyl diisocyanate

Assessment of 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. IARC Group 3 (not classifiable as to human carcinogenicity).

Information on: (OLIGOMER) 4,4'-Methylenediphenyl diisocyanate, oligomers

Assessment of carcinogenicity: Indication of possible carcinogenic effect in animal tests. However, the relevance of this result for humans is unclear.

Experimental/calculated data: OECD Guideline 453 rat Inhalation 0, 0.2, 1, 6 mg/m3

Result: Lung tumors

Reproductive toxicity

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

Teratogenicity

Assessment of 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.

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.

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Symptoms of Exposure

The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Eye irritation, skin irritation, allergic symptoms

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 (FEV, 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.

12. Ecological Information

Toxicity

Aquatic toxicity

Assessment of aquatic toxicity:

There is a high probability that the product is not acutely harmful to aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations. Based on long-term (chronic) toxicity study data, the product is very likely not harmful to aquatic organisms.

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.

Toxicity to fish

LC0 (96 h) > 1,000 mg/l, Brachydanio rerio (OECD Guideline 203, static)

Aquatic invertebrates

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

Aquatic plants

EC0 (72 h) 1,640 mg/l (growth rate), Scenedesmus subspicatus (OECD Guideline 201, static)

Microorganisms/Effect on activated sludge

Toxicity to microorganisms

OECD Guideline 209 aquatic

aerobic bacteria from a domestic water treatment plant/EC50 (3 h): > 100 mg/l

Persistence and degradability

Assessment biodegradation and elimination (H2O)

Poorly biodegradable. The product is unstable in water. The elimination data also refer to products of hydrolysis.

Elimination information

0 % BOD of the ThOD (28 d) (OECD Guideline 302 C) (aerobic, activated sludge) Poorly biodegradable.

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Assessment of stability in water

In contact with water the substance will hydrolyse slowly.

Information on Stability in Water (Hydrolysis)

$t_{1/2}$ 20 h (25 °C)

Bioaccumulative potential

Assessment bioaccumulation potential

Significant accumulation in organisms is not to be expected.

Bioaccumulation potential

Bioconcentration factor: 200 (28 d), Cyprinus carpio (OECD Guideline 305 E)

Mobility in soil

Assessment transport between environmental compartments

The substance will not evaporate into the atmosphere from the water surface.

Adsorption to solid soil phase is not expected.

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

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

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Federal Regulations

Registration status:

Chemical TSCA, US released / listed

EPCRA 311/312 (Hazard categories): Acute; Chronic

EPCRA 313:

CAS Number

101-68-8

Chemical name

Diphenylmethane-4,4'-diisocyanate (MDI)

CERCLA RQ

5000 LBS

CAS Number

101-68-8

Chemical name

Diphenylmethane-4,4'-diisocyanate (MDI)

State regulations

State RTK

NJ

CAS Number

101-68-8

Chemical name

Diphenylmethane-4,4'-diisocyanate (MDI)

26447-40-5

Methylenediphenyl diisocyanate

PA

101-68-8

Diphenylmethane-4,4'-diisocyanate (MDI)

NFPA Hazard codes:

Health : 2

Fire: 1

Reactivity: 1

Special:

HMIS III rating

Health: 2

Flammability: 1

Physical hazard: 1

16. Other Information

SDS Prepared by:

Marvel Industrial Coatings Product

Regulations

SDS Prepared on: 2016/02/05

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Safety Data Sheet

MarvelShield 391

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