



FLOORING SYSTEMS

forbo 660

The following Forbo Flooring product:

Forbo 660 2-Part Urethane Adhesive

is a kit comprised of the following two components:

Forbo 660 Part A (Resin)

Forbo 660 Part B (Hardener)

The Safety Data Sheets for the two components are attached after this cover sheet.

Forbo Flooring Systems
Humbolt Industrial Park
8 Maplewood Drive Hazelton PA 18202 USA
Phone: USA +1 (800) 842-7839
Canada +1 (800) 268-8108

SAFETY DATA SHEET

Forbo 660 2-Part Urethane Part A Resin
Revision Number 1

Revision Date: 16-Mar-2021
Supersedes Date: Not applicable

1. Identification

1.1. Product Identifier

Product Name Forbo 660 2-Part Urethane Part A Resin

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended use No information available.
Uses advised against No information available

1.3. Details of the supplier of the safety data sheet

Responsible Party

Forbo Flooring Systems
Humbolt Industrial Park
8 Maplewood Drive
Hazelton PA 18202 USA
Phone: USA +1 (800) 842-7839
Canada +1 (800) 268-8108

1.4. Emergency telephone number

Chemtrec (Transport/Environmental): 1-800-424-9300
1-703-527-3887 (Outside U.S.)
Rocky Mountain Poison Center: 1-866-767-5089

Section 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Not a dangerous substance or mixture according to OSHA 29 CFR 1910.1200

2.2. Label Elements

EMERGENCY OVERVIEW

Not a dangerous substance or mixture according to OSHA 29 CFR 1910.1200.

Appearance Paste	Physical State Liquid	Odor No information available
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Precautionary Statements - Prevention
Not applicable

Precautionary Statements - Response
Not applicable

Precautionary Statements - Storage
Not applicable

Precautionary Statements - Disposal

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Not applicable

Hazards not otherwise classified (HNOC)
Not applicable

2.3. Other Information

Small amounts of methanol (CAS 67-56-1) are formed by hydrolysis and released upon curing.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Not applicable

3.2 Mixtures

Chemical name	CAS No	Weight-%
Limestone	1317-65-3	30 - 60
Castor oil	8001-79-4	15 - 40
Carbonic acid, calcium salt (1:1)	471-34-1	1 - 5
Aluminum oxide (Al ₂ O ₃)	1344-28-1	1 - 5
Quartz	14808-60-7	0.1 - 1

**The exact percentage (concentration) of composition has been withheld as a trade secret.*

Section 4: FIRST AID MEASURES

4.1. Description of first aid measures

Eye contact	Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Hold eyelids apart and consult an physician.
Skin contact	Wash off immediately with soap and plenty of water. Get medical attention if symptoms occur.
Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
Ingestion	If swallowed, rinse mouth with water (only if the person is conscious). If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.
Self-protection of the first aider	Use personal protective equipment as required.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms None known.

4.3. Indication of any immediate medical attention and special treatment needed

Note to physicians Small amounts of methanol (CAS 67-56-1) are formed by hydrolysis and released upon curing. Treat symptomatically.

4.4. Reference to Other Sections

Reference to other sections Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION
Section 11: TOXICOLOGY INFORMATION

Section 5: FIRE-FIGHTING MEASURES

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5.1. Extinguishing media

Suitable extinguishing media

Carbon dioxide (CO₂). Extinguishing powder. Water spray or fog. Alcohol resistant foam.

Unsuitable extinguishing media

Strong water jet.

5.2. Special hazards arising from the substance or mixture

Specific hazards arising from the chemical

Thermal decomposition can lead to release of toxic/corrosive gases and vapors. Carbon monoxide. Carbon dioxide (CO₂).

Hazardous combustion products Carbon dioxide (CO₂).

Explosion data

Sensitivity to mechanical impact

None.

Sensitivity to static discharge

None.

5.3. Advice for firefighters

Special protective actions for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

Section 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions

Use personal protection equipment. Ensure adequate ventilation, especially in confined areas. Avoid contact with skin, eyes or clothing. Wash thoroughly after handling.

6.2. Environmental precautions

Environmental precautions

Prevent entry into waterways, sewers, basements or confined areas. Do not allow to enter into soil/subsoil. See Section 12 for additional Ecological Information.

6.3. Methods and material for containment and cleaning up

Methods for containment

Prevent further leakage or spillage if safe to do so. Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see Section 13).

Methods for cleaning up

Use personal protective equipment as required. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Take up mechanically, placing in appropriate containers for disposal. Clean contaminated surface thoroughly.

6.4. Reference to other sections

Reference to other sections

Section 7: HANDLING AND STORAGE
Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION
Section 13: DISPOSAL CONSIDERATIONS

Section 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Advice on safe handling

Use personal protective equipment as required. Handle in accordance with good industrial

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hygiene and safety practice. Do not eat, drink or smoke when using this product. Ensure adequate ventilation, especially in confined areas. Avoid contact with skin, eyes or clothing. Wash hands thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions Keep in properly labeled containers. Keep away from food, drink and animal feeding stuffs. Keep containers tightly closed in a cool, well-ventilated place. Keep from freezing. Recommended storage temperature. 50 - 95 °F.

Incompatible materials None known.

7.3. Specific end use(s)

Other information No information available.

7.4. References to Other Sections

Reference to other sections Section 13: DISPOSAL CONSIDERATIONS
Section 10: STABILITY AND REACTIVITY

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure Guidelines This product contains substances which in their raw state are powder form, however in this product they are in a non-respirable form. Inhalation of powder/dust particles is unlikely to occur from exposure to this product. Small amounts of methanol (CAS 67-56-1) are formed by hydrolysis and released upon curing.

Chemical name	ACGIH TLV	NIOSH	OSHA PEL	Mexico
Limestone 1317-65-3	No data available	TWA: 10 mg/m ³ total dust TWA: 5 mg/m ³ respirable dust	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction	-
Carbonic acid, calcium salt (1:1) 471-34-1	No data available	TWA: 10 mg/m ³ total dust TWA: 5 mg/m ³ respirable dust	-	-
Aluminum oxide (Al ₂ O ₃) 1344-28-1	TWA: 1 mg/m ³ respirable particulate matter	-	TWA: 15 mg/m ³ total dust TWA: 5 mg/m ³ respirable fraction	TWA: 10 mg/m ³ TWA: 1 ppm
Quartz 14808-60-7	TWA: 0.025 mg/m ³ respirable particulate matter	IDLH: 50 mg/m ³ respirable dust TWA: 0.05 mg/m ³ respirable dust	TWA: 50 µg/m ³ excludes construction work, agricultural operations, and exposures that result from the processing of sorptive clays : (250)/(%SiO ₂ + 5) mppcf TWA respirable fraction : (10)/(%SiO ₂ + 2) mg/m ³ TWA respirable fraction	TWA: 0.025 mg/m ³

Chemical name	Argentina	Brazil	Chile	Venezuela
Limestone 1317-65-3	TWA: 10 mg/m ³	-	TWA: 7 mg/m ³	-
Carbonic acid, calcium salt (1:1) 471-34-1	-	-	-	TWA: 10 mg/m ³
Aluminum oxide (Al ₂ O ₃) 1344-28-1	TWA: 10 mg/m ³	TWA: 1 mg/m ³	-	TWA: 10 mg/m ³
Quartz 14808-60-7	TWA: 0.05 mg/m ³	TWA: 0.025 mg/m ³	TWA: 0.08 mg/m ³	TWA: 0.025 mg/m ³

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Chemical name	ACGIH TLV	NIOSH	OSHA PEL	Mexico
Methyl alcohol 67-56-1	STEL: 250 ppm TWA: 200 ppm S*	IDLH: 6000 ppm TWA: 200 ppm TWA: 260 mg/m ³ STEL: 250 ppm STEL: 325 mg/m ³	TWA: 200 ppm TWA: 260 mg/m ³	TWA: 200 ppm STEL: 250 ppm

Chemical name	Argentina	Brazil	Chile	Venezuela
Methyl alcohol 67-56-1	TWA: 200 ppm Skin STEL: 250 ppm	TWA: 156 ppm TWA: 200 mg/m ³ Skin	TWA: 175 ppm TWA: 229 mg/m ³ Skin	Skin STEL: 250 ppm TWA: 200 ppm

8.2. Exposure controls

OTHER INFORMATION Small amounts of methanol (CAS 67-56-1) are formed by hydrolysis and released upon curing.

Engineering controls Showers
Eyewash stations
Ventilation systems.

Personal protective equipment [PPE]

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin and body protection Wear suitable chemical resistant gloves. The selection of suitable gloves does not only depend on the material, but also on further marks of quality and various manufacturers.

Respiratory protection If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General hygiene considerations Use personal protective equipment as required. Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product. Avoid contact with skin, eyes or clothing. Wash hands thoroughly after handling. Take off contaminated clothing and wash before reuse. Regular cleaning of equipment, work area and clothing is recommended.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical state Liquid

Appearance Paste

Color No information available

Odor No information available

Odor threshold No information available

Property	Values	Remarks • Method
pH	No data available	None known
Melting point / freezing point	No data available	None known
Boiling point / boiling range	No data available	None known
Flash point	= 260 °C / 500 °F	
Evaporation rate	No data available	None known
Flammability (solid, gas)	Not applicable for liquids .	
Flammability Limit in Air		None known
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Vapor pressure	No data available	None known
Vapor density	No data available	None known
Relative density	No data available	None known

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Water solubility	No data available	None known
Solubility(ies)	No data available	None known
Partition coefficient	No data available	None known
Autoignition temperature	No data available	None known
Decomposition temperature	-	None known
Kinematic viscosity	No data available	None known
Dynamic viscosity	450 - 650 Pa.s	
Explosive properties	No information available	
Oxidizing properties	No information available	

9.2. Other information

Softening Point	No information available	
Molecular weight	No information available	
Solvent content (%)	No information available	
Solid content (%)	No information available	
Density	1.65 g/cm ³	
VOC Content (%)		0 g/L / 0 %

Section 10: STABILITY AND REACTIVITY

10.1. Reactivity

None under normal use conditions.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None known.

10.4. Conditions to avoid

Exposure to air or moisture over prolonged periods.

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products

None under normal use conditions.

Section 11: TOXICOLOGY INFORMATION

11.1. Information on toxicological effects

Product Information	No data available
Inhalation	Based on available data, the classification criteria are not met.
Eye contact	Based on available data, the classification criteria are not met.
Skin contact	Based on available data, the classification criteria are not met.
Ingestion	Based on available data, the classification criteria are not met.

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Limestone	>5000 mg/kg (Rattus)	-	-

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1317-65-3 Carbonic acid, calcium salt (1:1) 471-34-1	LD50 > 2000 mg/kg (Rattus) OECD 420	LD50 >2000 mg/kg (Rattus) OECD 402	LC50 (4h) >3mg/ml (Rattus)
Aluminum oxide (Al ₂ O ₃) 1344-28-1	>5000 mg/kg (Rattus)	-	-
Quartz 14808-60-7	>2000 mg/kg (Rattus)	-	-

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Symptoms	No information available.
Skin corrosion/irritation	No information available.
Serious eye damage/eye irritation	No information available.
Irritation	No information available.
Corrosivity	No information available.
Sensitization	No information available.
Germ cell mutagenicity	No information available.
Reproductive toxicity	No information available.
Developmental toxicity	No information available.
Teratogenicity	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.
Chronic Toxicity	No information available.
Target organ effects	No information available.
Aspiration hazard	Not applicable.
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen. As Quartz (14808-60-7) is inextricably bound in the polymer matrix, it is not expected to be available as an airborne hazard (dust, mist, or spray) under normal condition of uses.

Chemical name	ACGIH	IARC	NTP	OSHA
Quartz 14808-60-7	A2	Group 1	Known	X

ACGIH (American Conference of Governmental Industrial Hygienists)

A2 - Suspected Human Carcinogen

IARC (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

NTP (National Toxicology Program)

Known - Known Carcinogen

OSHA (Occupational Safety and Health Administration of the US Department of Labor)

X - Present

Section 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Limestone 1317-65-3	CE50 (72h) >200mg/L Algae (Desmodesmus subspicatus)	CL50 (96h) >10000mg/L (Oncorhynchus mykiss)		CE50 (48h) >1000 mg/L Daphnia Magna
Carbonic acid, calcium salt (1:1) 471-34-1	IC50 72H Algae >1000 mg/l	CL50 96H >1000 mg/l		EC50 48H Daphnia >1000 mg/l

12.2. Persistence and degradability

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No information available.

12.3. Bioaccumulative potential

No information available.

12.4. Mobility in soil

No information available.

Other adverse effects

No information available

Section 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Disposal of Wastes

It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Contaminated packaging

Dispose of in accordance with federal, state and local regulations

Section 14: TRANSPORT INFORMATION

DOT Not regulated

IATA Not regulated

IMDG Not regulated

Section 15: REGULATORY INFORMATION

Global Inventories

TSCA	Listed
DSL	Listed

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL - Canadian Domestic Substances List

Listed - The components of this product are either listed or exempt from listing on inventory.

Not Listed - One or more components of this product are not listed on inventory.

United States of America

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	CAS No
Aluminum oxide (Al ₂ O ₃)	1344-28-1

SARA 311/312 Hazard Categories

Classification is shown in section 2 of this SDS

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Europe

Restrictions of Use of Hazardous Substances (RoHS) Directive 2011/65/EU

This product does not contain Lead (7439-92-1), Cadmium (7440-43-9), Mercury (7439-97-6), Hexavalent chromium (7440-47-3), Polybrominated biphenyls (PBB), and Polybrominated diphenyl ethers (PBDE) above the regulated limit mentioned in this regulation

SVHC: Substances of Very High Concern for Authorization:

This product does not contain candidate substances of very high concern at a concentration $\geq 0.1\%$ (Regulation (EC) No. 1907/2006 (REACH), Article 59)

Section 16: OTHER INFORMATION

Key or legend to abbreviations and acronyms used in the safety data sheet

No information available

Key literature references and sources for data

No information available

Revision date 16-Mar-2021

Revision note Not applicable.

Training Advice No information available

Further information No information available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

SAFETY DATA SHEET

In accordance with OSHA 29 CFR 1910.1200

Forbo 660 Part B Hardener
Revision Number 1

Revision Date: 16-Mar-2021
Supersedes Date: Not applicable

1. Identification

1.1. Product Identifier

Product Name Forbo 660 Part B Hardener

Other means of identification

Other information Not applicable

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended use Hardener
Restrictions on use No information available

1.3. Details of the supplier of the safety data sheet

Responsible Party

Forbo Flooring Systems
Humbolt Industrial Park
8 Maplewood Drive
Hazelton PA 18202 USA
Phone: USA +1 (800) 842-7839
Canada +1 (800) 268-8108

1.4. Emergency telephone number

Chemtrec (Transport/Environmental): 1-800-424-9300
1-703-527-3887 (Outside U.S.)
Rocky Mountain Poison Center: 1-866-767-5089

2. Hazard(s) identification

2.1. Classification of the substance or mixture

Acute toxicity - Inhalation (Dusts/Mists)	Category 4
Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Respiratory sensitization	Category 1
Skin sensitization	Category 1
Specific target organ toxicity (single exposure)	Category 3
Specific target organ toxicity (repeated exposure)	Category 2

Hazards not otherwise classified (HNOC)

Not applicable

2.2. Label Elements

EMERGENCY OVERVIEW

Danger

Hazard statements

Harmful if inhaled
Causes skin irritation
Causes serious eye irritation

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May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction
May cause respiratory irritation
May cause damage to organs through prolonged or repeated exposure



Appearance Paste

Physical state

Liquid

Odor Musty

Precautionary Statements - Prevention

Use only outdoors or in a well-ventilated area
Wash face, hands and any exposed skin thoroughly after handling
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing must not be allowed out of the workplace
Do not breathe dust/fume/gas/mist/vapors/spray
Wear protective gloves/eye protection/face protection

Precautionary Statements - Response

Get medical advice/attention if you feel unwell
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
IF ON SKIN: Wash with plenty of water and soap
Take off contaminated clothing and wash it before reuse
If skin irritation or rash occurs: Get medical advice/attention
IF INHALED: Remove person to fresh air and keep comfortable for breathing
If experiencing respiratory symptoms: Call a POISON CENTER or doctor

Precautionary Statements - Storage

Store in a well-ventilated place. Keep container tightly closed
Store locked up

Precautionary Statements - Disposal

Dispose of contents/ container to an approved waste disposal plant

Unknown acute toxicity

62 % of the mixture consists of ingredient(s) of unknown toxicity

2.3. Other Information

No information available.

3. Composition/information on ingredients

3.1. Substances

Not applicable.

Mixture

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Large Fire

Water spray or fog.

Unsuitable extinguishing media

Do not scatter spilled material with high pressure water streams.

5.2. Special hazards arising from the substance or mixture

Specific hazards arising from the chemical

Product is or contains a sensitizer. May cause sensitization by inhalation and skin contact. Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Hazardous combustion products

Carbon monoxide. Carbon dioxide (CO₂). Nitrogen oxides (NO_x). Hydrogen cyanide. Isocyanates.

Explosion data

Sensitivity to mechanical impact None.

Sensitivity to static discharge None.

5.3. Advice for firefighters

Special protective equipment for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions

Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Do not touch or walk through spilled material. Ensure adequate ventilation. Avoid breathing vapors or mists. Avoid contact with skin, eyes or clothing. Wash thoroughly after handling.

Other information

Refer to protective measures listed in Sections 7 and 8.

6.2. Environmental precautions

Environmental precautions

Prevent further leakage or spillage if safe to do so. See Section 12 for additional Ecological Information.

6.3. Methods and material for containment and cleaning up

Methods for containment

Prevent further leakage or spillage if safe to do so. Dike far ahead of liquid spill for later disposal. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. Do NOT close container (evolution of carbon dioxide - CO₂). Keep wet and put outdoors in a secured place for a few days. Then dispose to of according to local / national regulations (see Section 13).

Methods for cleaning up

Use personal protective equipment as required. Dam up. Soak up with inert absorbent material. Pick up and transfer to properly labeled containers. 2%, Liquid dishwashing soap, a mixture of 90% water and 8-10% sodium carbonate. Decontaminate floor with decontamination solution letting stand for at least 15 minutes. Clean contaminated surface thoroughly.

See section 8 for more information. See section 13 for more information.

7. Handling and storage

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Supersedes Date: Not applicable

7.1. Precautions for safe handling

Advice on safe handling

Use personal protective equipment as required. Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product. Avoid breathing vapors or mists. Ensure adequate ventilation. Provide extract ventilation to points where emissions occur. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid contact with skin, eyes or clothing. Wash thoroughly after handling. Take off contaminated clothing and wash before reuse. Use according to package label instructions. Please refer also to Safety Data Sheet of Part A.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions

Keep in properly labeled containers. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from food, drink and animal feeding stuffs. Protect from moisture. Keep at temperatures between 10 and 30 °C.

7.3 References to other sections

Reference to other sections

Section 10: STABILITY AND REACTIVITY
Section 13: DISPOSAL CONSIDERATIONS

8. Exposure controls/personal protection

8.1. Control parameters

Exposure Limits

The following ingredients are the only ingredients of the product above the cut-off level (or level that contributes to the hazard classification of the mixture) which have an exposure limit applicable in the region for which this safety data sheet is intended or other recommended limit. At this time, the other relevant constituents have no known exposure limits from the sources listed here.

Chemical name	ACGIH TLV	OSHA PEL	NIOSH
4,4'-Methylenediphenyl diisocyanate 101-68-8	TWA: 0.005 ppm	Ceiling: 0.02 ppm Ceiling: 0.2 mg/m ³	IDLH: 75 mg/m ³ Ceiling: 0.020 ppm 10 min Ceiling: 0.2 mg/m ³ 10 min TWA: 0.005 ppm TWA: 0.05 mg/m ³

Chemical name	Argentina	Brazil	Chile	Colombia
4,4'-Methylenediphenyl diisocyanate 101-68-8	TWA: 0.005 ppm	TWA: 0.005 ppm	TWA: 0.004 ppm TWA: 0.05 mg/m ³	-

Chemical name	Costa Rica	Peru	Uruguay	Venezuela
4,4'-Methylenediphenyl diisocyanate 101-68-8	-	-	-	TWA: 0.005 ppm

8.2. Exposure controls

Appropriate engineering controls

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Engineering controls
Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection Tight sealing safety goggles. If splashes are likely to occur: Face protection shield. Avoid contact with eyes.

Hand protection Wear suitable gloves. Impervious gloves. The selection of suitable gloves does not only depend on the material, but also on further marks of quality and various manufacturers.

Skin and body protection Wear suitable protective clothing. Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Long sleeved clothing.

Respiratory protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

General hygiene considerations Wear suitable gloves and eye/face protection. Handle in accordance with good industrial hygiene and safety practice. Do not eat, drink or smoke when using this product. Avoid breathing vapors or mists. Avoid contact with skin, eyes or clothing. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Regular cleaning of equipment, work area and clothing is recommended.

9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Liquid
Appearance	Paste
Color	Brown
Odor	Musty
Odor threshold	No information available

Property	Values	Remarks • Method
pH	No data available	None known
Melting point / freezing point	No data available	None known
Boiling point / boiling range	208 °C / 406.4 °F	
Flash point	198 °C / 388.4 °F	
Evaporation rate	No data available	None known
Flammability (solid, gas)	Not applicable for liquids	
Flammability Limit in Air		None known
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Vapor pressure	<0.0001	mmHg @ 25 °C
Vapor density	No data available	None known
Relative density	No data available	None known
Water solubility	Insoluble	
Solubility(ies)	No data available	None known
Partition coefficient	No data available	None known
Autoignition temperature	No data available	None known
Decomposition temperature	No data available	None known

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Supersedes Date: Not applicable

Kinematic viscosity	No data available	None known
Dynamic viscosity	150 - 250 mPa s	@ 25 °C

9.2. Other information

Explosive properties	No information available
Oxidizing properties	No information available
Solvent content (%)	No information available
Solid content (%)	No information available
Softening Point	No information available
Molecular weight	No information available
VOC Content (%)	No information available
Density	1.234 g/cm ³
Bulk density	No information available

10. Stability and reactivity

10.1. Reactivity

Reactivity No information available.

10.2. Chemical stability

Chemical stability Stable under normal conditions.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions Exothermic reaction with. Amines. Contact with water (moisture) liberates carbon dioxide, which causes pressure increase in closed containers. Alcohols.

Hazardous polymerization Hazardous polymerization may take place during a fire due to heat. Closed containers could violently rupture.

10.4. Conditions to avoid

Conditions to avoid Excessive heat. Protect from moisture.

10.5. Incompatible materials

Incompatible materials Water. Amines. Strong acids. Strong bases. Strong oxidizing agents. Alcohols. Copper.

10.6. Hazardous decomposition products

Hazardous decomposition products Carbon oxides Nitrogen oxides (NOx) Isocyanates

11. Toxicological information

11.1. Information on toxicological effects

Product Information

Inhalation	Harmful by inhalation. May cause sensitization in susceptible persons. May cause irritation of respiratory tract.
Eye contact	Causes serious eye irritation. May cause redness, itching, and pain.
Skin contact	Repeated or prolonged skin contact may cause allergic reactions with susceptible persons. May cause sensitization by skin contact. Causes skin irritation.

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Ingestion

May cause additional effects as listed under "Inhalation". Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms

Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain, or flushing. Asthma-like and/ or skin allergy-like symptoms. Coughing and/ or wheezing. Itching. Rashes. Hives. Redness. May cause redness and tearing of the eyes.

Acute toxicity

Numerical measures of toxicity

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (inhalation-dust/mist) 1.50 mg/l

Unknown acute toxicity

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Isocyanic acid, polymethylenepolyphenylene ester 9016-87-9	LD50 > 10000 mg/kg (Rattus)	LD 50 > 9400 mg/kg (Oryctolagus cuniculus)	=1.5 mg/L (Rattus) 4 h
4,4'-Methylenediphenyl diisocyanate 101-68-8	=31600 mg/kg (Rattus) = 9200 mg/kg (Rattus)	LD 50 > 9400 mg/kg (Oryctolagus cuniculus) OECD 402	=1.5 mg/L (Rattus) 4 h
Benzene, 1-isocyanato-2-[(4-isocyanatophenyl)methyl]- 5873-54-1	LD50 > 2000 mg/Kg (Rattus)	LD 50 > 9400 mg/kg (Oryctolagus cuniculus) OECD 402	=1.5 mg/L (4h) Rat
Benzene, 1,1'-methylenebis[2-isocyanato- 2536-05-2	LD50 > 2000 mg/kg (Rattus)	LD 50 > 9400 mg/kg (Oryctolagus cuniculus) OECD 402	=1.5 mg/L (4h) Rat

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation

Classification based on data available for ingredients. Irritating to skin.

Isocyanic acid, polymethylenepolyphenylene ester (9016-87-9)

Method	Species	Exposure route	Effective dose	Exposure time	Results
OECD Test No. 404: Acute Dermal Irritation/Corrosion	Rabbit				Mild skin irritant

Serious eye damage/eye irritation

Classification based on data available for ingredients. Causes serious eye irritation.

4,4'-Methylenediphenyl diisocyanate (101-68-8)

Method	Species	Exposure route	Effective dose	Exposure time	Results
OECD Test No. 405: Acute Eye Irritation/Corrosion	Rabbit	Eye	0.1 mL	24 hours	Non-irritant

Respiratory or skin sensitization

May cause sensitization by inhalation. May cause sensitization by skin contact.

Isocyanic acid, polymethylenepolyphenylene ester (9016-87-9)

Method	Species	Exposure route	Results
OECD Test No. 406: Skin Sensitization	Guinea pig		No sensitization responses were observed
OECD Test No. 429: Skin	Mouse		sensitizing

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Sensitisation: Local Lymph Node Assay			
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4,4'-Methylenediphenyl diisocyanate (101-68-8)

Method	Species	Exposure route	Results
OECD GD 39	Rat	Inhalation	Sensitizing

Germ cell mutagenicity Based on available data, the classification criteria are not met.

Carcinogenicity Based on available data, the classification criteria are not met.

The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical name	ACGIH	IARC	NTP	OSHA
Isocyanic acid, polymethylenepolyphenylene ester 9016-87-9	-	Group 3	-	-
4,4'-Methylenediphenyl diisocyanate 101-68-8	-	Group 3	-	-

Legend

Isocyanic acid, polymethylenepolyphenylene ester (9016-87-9)

Method	Species	Results
OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies	Rat	Carcinogenic

4,4'-Methylenediphenyl diisocyanate (101-68-8)

Method	Species	Results
OECD Test No. 453: Combined Chronic Toxicity/Carcinogenicity Studies	Rat	Limited evidence of a carcinogenic effect

Reproductive toxicity Based on available data, the classification criteria are not met.

STOT - single exposure May cause respiratory irritation.

STOT - repeated exposure May cause damage to organs through prolonged or repeated exposure.
Target organ effects Eyes, Skin, Lungs, Respiratory system.

Aspiration hazard Based on available data, the classification criteria are not met.

Other adverse effects No information available.

Interactive effects No information available.

12. Ecological information

12.1. Toxicity

Ecotoxicity

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Isocyanic acid, polymethylenepolyphenylene ester	ErC50 (72h) >1640 mg/L Algae (scenedesmus subspicatus) (OECD 201)	CL50 (96h) >1000 mg/L (Danio rerio)	-	EC50 (24H) >1000 mg/L Daphnia magna

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9016-87-9				
4,4'-Methylenediphenyl diisocyanate 101-68-8	ErC50 (72h) >1640 mg/L Algae (scenedesmus subspicatus) (OECD 201)	>1000 mg/l (Danio rerio)	-	EC50 (24H) >1000 mg/L Daphnia magna
Benzene, 1-isocyanato-2-[(4-isocyanatophenyl)methyl]- 5873-54-1	ErC50 (72h) >1640 mg/L Algae (scenedesmus subspicatus) (OECD 201)	LC50 (96 h) > 1000 mg/l (Danio rerio) OECD 203	-	EC50 (24H) >1000 mg/L Daphnia magna
Benzene, 1,1'-methylenebis[2-isocyanato- 2536-05-2	-	LC50 (96 h) > 1000 mg/l (Danio rerio) OECD 203	-	-

12.2. Persistence and degradability

Persistence and degradability No information available.

12.3. Bioaccumulative potential

Bioaccumulation There is no data for this product.

Component Information

Chemical name	Partition coefficient
4,4'-Methylenediphenyl diisocyanate 101-68-8	4.51

12.4. Mobility in soil

Mobility No information available.

Other adverse effects

Other adverse effects No information available.

13. Disposal considerations

13.1. Waste treatment methods

Waste from residues/unused products It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Contaminated packaging Dispose of in accordance with federal, state and local regulations. Handle contaminated packages in the same way as the product itself. Do not reuse empty containers.

14. Transport information

DOT Not regulated

IATA Not regulated

IMDG Not regulated

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15. Regulatory information

International Inventories

TSCA	Listed
DSL	Listed

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL - Canadian Domestic Substances List

Listed - The components of this product are either listed or exempt from listing on inventory.

Not Listed - One or more components of this product are not listed on inventory.

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Chemical name	CAS No	SARA 313 - Threshold Values %
Isocyanic acid, polymethylenepolyphenylene ester	9016-87-9	1.0
4,4'-Methylenediphenyl diisocyanate	101-68-8	1.0
Benzene, 1-isocyanato-2-[(4-isocyanatophenyl)methyl]-	5873-54-1	1.0
Benzene, 1,1'-methylenebis[2-isocyanato-	2536-05-2	1.0

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

Europe

Restrictions of Use of Hazardous Substances (RoHS) Directive 2011/65/EU

This product does not contain Lead (7439-92-1), Cadmium (7440-43-9), Mercury (7439-97-6), Hexavalent chromium (7440-47-3), Polybrominated biphenyls (PBB), and Polybrominated diphenyl ethers (PBDE) above the regulated limit mentioned in this regulation

SVHC: Substances of Very High Concern for Authorization:

This product does not contain candidate substances of very high concern at a concentration $\geq 0.1\%$ (Regulation (EC) No. 1907/2006 (REACH), Article 59)

16. Other information

Key or legend to abbreviations and acronyms used in the safety data sheet

Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation

Revision Date: 16-Mar-2021

Revision note US - EN No information available.

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Disclaimer

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End of Safety Data Sheet