SAFETY DATA SHEET
THE DOW CHEMICAL COMPANY*

Product name: MOR-FREE™ C-33

Issue Date: 04/28/2015
Print Date: 08/03/2015

THE DOW CHEMICAL COMPANY* encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. IDENTIFICATION

Product name: MOR-FREE™ C-33

Recommended use of the chemical and restrictions on use
Identified uses: Packaging laminating adhesives

COMPANY IDENTIFICATION
THE DOW CHEMICAL COMPANY*
Agent for Rohm and Haas Chemicals LLC
100 INDEPENDENCE MALL WEST
PHILADELPHIA PA 19106-2399
UNITED STATES

Customer Information Number: 215-592-3000
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 1 800 424 9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.
Acute toxicity - Category 3 - Inhalation
Skin sensitisation - Category 1
Specific target organ toxicity - single exposure - Category 3

Label elements
Hazard pictograms

Signal word: **DANGER!**

Hazards
May cause an allergic skin reaction.
Toxic if inhaled.
May cause respiratory irritation.

Precautionary statements

Prevention
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing should not be allowed out of the workplace.
Wear protective gloves.

Response
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician.
If skin irritation or rash occurs: Get medical advice/ attention.
Wash contaminated clothing before reuse.

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

Disposal
Dispose of contents/ container to an approved waste disposal plant.

Other hazards
no data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: (2,4,6-trioxotriazine-1,3,5(2H,4H,6H)-triyl)tris(hexamethylene) isocyanate
This product is a substance.

Component	CASRN	Concentration
Hexamethylenediisocyanate trimer	3779-63-3	> 99.8 - 100.0 %
Hexamethylene diisocyanate	822-06-0	< 0.2 %

4. FIRST AID MEASURES

Description of first aid measures
Inhalation: Remove to fresh air. In case of shortness of breath, give oxygen. Immediate medical attention is required.

Skin contact: Take off all contaminated clothing immediately. Wash off immediately with soap and plenty of water. If skin irritation persists, call a physician. Wash contaminated clothing before re-use. Do not take clothing home to be laundered.

Eye contact: Rinse immediately with plenty of water for at least 15 minutes. If eye irritation persists, consult a specialist.

Ingestion: Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Drink 1 or 2 glasses of water. Call a physician immediately. If a person vomits when lying on his back, place him in the recovery position.

Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: Bronchial constriction may develop after extensive exposure to isocyanates, even in individuals who have not been shown to be previously sensitized.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media: no data available

Special hazards arising from the substance or mixture
Hazardous combustion products: During a fire, irritating and highly toxic gases and/or fumes may be generated during combustion or decomposition.

Unusual Fire and Explosion Hazards: Do not allow run-off from fire fighting to enter drains or water courses. Closed containers may explode when heated or contents contaminated with water.

Advice for firefighters
Fire Fighting Procedures: Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Ventilate the area. Refer to protective measures listed in sections 7 and 8. MATERIAL IS A POTENTIAL SENSITIZER.

Environmental precautions: Try to prevent the material from entering drains or water courses. Do not contaminate surface water.

Methods and materials for containment and cleaning up: Ventilate the area. Evacuate personnel to safe areas. Floor may be slippery; use care to avoid falling. Contain spills immediately with inert

materials (e.g., sand, earth). Transfer liquids and solid diking material to separate suitable containers for recovery or disposal.
No conditions to be specially mentioned.

7. HANDLING AND STORAGE

Precautions for safe handling: Avoid contact with skin and eyes. For personal protection see section 8. CONTAINERS MAY BE HAZARDOUS WHEN EMPTY. Since emptied containers retain product residue follow all MSDS and label warnings even after container is emptied.

Conditions for safe storage: Keep container tightly closed in a dry and well-ventilated place.
Other data: This material is a potential skin sensitizer. See SECTION 8, Exposure Controls/Personal Protection, prior to handling.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Hexamethylene diisocyanate	ACGIH	TWA	0.005 ppm

Exposure controls
Engineering controls: Use local exhaust ventilation with a minimum capture velocity of 100 ft/min. (0.5 m/sec.) at the point of vapor evolution. Refer to the current edition of Industrial Ventilation: A Manual of Recommended Practice published by the American Conference of Governmental Industrial Hygienists for information on the design, installation, use, and maintenance of exhaust systems.

Hygiene measures: Keep container closed when not in use. Shower or bathe at the end of working.

Protective measures: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Individual protection measures

Eye/face protection: Tightly fitting safety goggles. Eye protection worn must be compatible with respiratory protection system employed.

Skin protection

Hand protection: Chemical-resistant gloves should be worn whenever this material is handled. The glove(s) listed below may provide protection against permeation. (Gloves of other chemically resistant materials may not provide adequate protection): 4H Glove (Trademark of Safety 4 A/S of Denmark) Butyl-rubber. Gloves should be removed and replaced immediately if there is any indication of degradation or chemical breakthrough. Before removing gloves clean them with soap and water. NOTE: Material is a possible skin sensitizer.

Other protection: Avoid all skin contact. Selection of specific personal protective equipment such as long sleeves, safety glasses with side shields, face shield, safety shoes, boots, apron, or full body suit will depend on the task.

Respiratory protection: A respiratory protection program meeting OSHA 1910.134 and ANSI Z88.2 requirements or equivalent must be followed whenever workplace conditions warrant a respirator's use. None required if airborne concentrations are maintained below the exposure limit listed in Exposure Limit Information. Above the exposure limit: Wear a properly fitted NIOSH approved (or equivalent) self-contained breathing apparatus in the pressure demand

mode, OR full-facepiece, airline respirator in the pressure demand mode with emergency escape provision.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Physical state	liquid
Color	Pale Yellow to Amber
Odor	Slight odor
Odor Threshold	no data available
pH	Not Applicable
Melting point/range	no data available
Freezing point	no data available
Boiling point (760 mmHg)	Not Applicable
Flash point	**closed cup** 158.00 °C (316.40 °F) *SETAFLASH CLOSED CUP*
Evaporation Rate (Butyl Acetate = 1)	Not Applicable
Flammability (solid, gas)	Not Applicable
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapor Pressure	0.0000067 mmHg at < 20.00 °C (< 68.00 °F)
Relative Vapor Density (air = 1)	Not Applicable
Relative Density (water = 1)	1.1600 at 20.00 °C (68.00 °F)
Water solubility	Insoluble, reacts
Partition coefficient: n-octanol/water	no data available
Auto-ignition temperature	460.00 °C (860.00 °F)
Decomposition temperature	no data available
Dynamic Viscosity	3,000.000 mPa.s at 23.00 °C (73.40 °F) 3,000.000 mPa.s at 23.00 °C (73.40 °F)
Kinematic Viscosity	no data available
Explosive properties	no data available
Oxidizing properties	no data available
Molecular weight	no data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: no data available

Chemical stability: no data available

Possibility of hazardous reactions: Stable under recommended storage conditions. However, keep away from moisture, heat or flame.
Product will not undergo polymerization.

Conditions to avoid: None known.

Incompatible materials: Avoid contact with the following: Water Strong acids Strong bases Strong Oxidizers

Hazardous decomposition products: Thermal decomposition may yield the following: isocyanate monomers Hydrogen cyanide (hydrocyanic acid)

11. TOXICOLOGICAL INFORMATION

Toxicological information on this product or its components appear in this section when such data is available.

Acute toxicity

Acute oral toxicity
Product test data not available.

Acute dermal toxicity
Product test data not available.

Acute inhalation toxicity
Product test data not available.

Skin corrosion/irritation
Product test data not available.

Serious eye damage/eye irritation
Product test data not available.

Sensitization
Product test data not available.

Specific Target Organ Systemic Toxicity (Single Exposure)
Product test data not available.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
Product test data not available.

Carcinogenicity
Product test data not available.

Teratogenicity
Product test data not available.

Reproductive toxicity

Product test data not available.

Mutagenicity
Product test data not available.

Aspiration Hazard
Product test data not available.

Additional information
No toxicity data are available for this material.

COMPONENTS INFLUENCING TOXICOLOGY:

Hexamethylenediisocyanate trimer

Acute oral toxicity
For similar material(s): LD50, Rat, female, 2,500 mg/kg No deaths occurred at this concentration.

Acute dermal toxicity
For similar material(s): LD50, Rat, male and female, > 2,000 mg/kg OECD 402 or equivalentNo deaths occurred at this concentration.

Acute inhalation toxicity
Excessive exposure may cause severe irritation to upper respiratory tract (nose and throat) and lungs. Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening. May cause pulmonary edema (fluid in the lungs.) Effects may be delayed. Decreased lung function has been associated with overexposure to isocyanates.

The LC50 has not been determined.

Skin corrosion/irritation
Brief contact may cause slight skin irritation with local redness.

Serious eye damage/eye irritation
May cause slight eye irritation.
Corneal injury is unlikely.

Sensitization
For similar material(s):
Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
For similar material(s):
No signs of respiratory sensitization have been reported.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory system

Specific Target Organ Systemic Toxicity (Repeated Exposure)
For similar material(s):
In animals, effects have been reported on the following organs:

Respiratory tract.

Carcinogenicity
No relevant data found.

Teratogenicity
No relevant data found.

Reproductive toxicity
No relevant data found.

Mutagenicity
In vitro genetic toxicity studies were negative.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

Hexamethylene diisocyanate

Acute oral toxicity
LD50, Rat, 710 mg/kg

Acute dermal toxicity
LD50, Rat, > 7,000 mg/kg

Acute inhalation toxicity
LC50, Rat, 4 Hour, vapour, 0.124 mg/l

Skin corrosion/irritation
Brief contact may cause skin burns. Symptoms may include pain, severe local redness and tissue damage.
Vapor may cause skin irritation.

Serious eye damage/eye irritation
May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.
Vapor may cause eye irritation experienced as mild discomfort and redness.
Vapor may cause lacrimation (tears).

Sensitization
Has caused allergic skin reactions in humans.
Hexamethylene diisocyanate is a potent skin sensitizer. Severe skin rash/allergic skin reactions have been noted in people exposed to aerosols/vapors of heated material.

May cause allergic respiratory reaction.
Reexposure to extremely low isocyanate concentrations may cause allergic respiratory reactions in individuals already sensitized.

Specific Target Organ Systemic Toxicity (Single Exposure)
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

Specific Target Organ Systemic Toxicity (Repeated Exposure)

Excessive exposure may cause severe irritation to upper respiratory tract (nose and throat) and lungs.
Excessive exposure may cause lung injury.
Excessive exposure may produce organophosphate type cholinesterase inhibition.
In animals, effects have been reported on the following organs:
Gastrointestinal tract.

Carcinogenicity
Did not cause cancer in laboratory animals.

Teratogenicity
Did not cause birth defects or other effects in the fetus even at doses which caused toxic effects in the mother. Did not cause birth defects or any other fetal effects in laboratory animals.

Reproductive toxicity
In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

Mutagenicity
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Aspiration Hazard
Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

12. ECOLOGICAL INFORMATION

Ecotoxicological information on this product or its components appear in this section when such data is available.

General Information
There is no data available for this product.

Toxicity

Hexamethylenediisocyanate trimer

Acute toxicity to fish
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
For similar material(s):
LL50, zebra fish (Brachydanio rerio), static test, 96 hrs, > 100 mg/l

Acute toxicity to aquatic invertebrates
For similar material(s):
EL50, Daphnia magna (Water flea), static test, 48 hrs, 127 mg/l

Acute toxicity to algae/aquatic plants
For similar material(s):
ErC50, Desmodesmus subspicatus (green algae), static test, 72 hrs, Growth rate inhibition, > 1,000 mg/l, OECD Test Guideline 201 or Equivalent

Hexamethylene diisocyanate

Acute toxicity to fish

The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species.
Not expected to be acutely toxic to aquatic organisms.
LC0, Danio rerio (zebra fish), static test, 96 Hour, >= 82.8 mg/l

Acute toxicity to aquatic invertebrates

EC0, Daphnia magna (Water flea), Static, 48 Hour, >= 89.1 mg/l

Acute toxicity to algae/aquatic plants

No toxicity up to the level of maximum water solubility.
ErC50, Desmodesmus subspicatus (green algae), Static, 72 Hour, Growth rate inhibition, > 77.4 mg/l

Persistence and degradability

Hexamethylenediisocyanate trimer

Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
For similar material(s): 10-day Window: Fail
Biodegradation: 1 %
Exposure time: 28 d
Method: OECD Test Guideline 301D or Equivalent

Hexamethylene diisocyanate

Biodegradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 302C or Equivalent
10-day Window: Fail
Biodegradation: 42 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent

Theoretical Oxygen Demand: 2.38 mg/mg

Photodegradation

Test Type: Half-life (indirect photolysis)
Sensitizer: OH radicals
Atmospheric half-life: 1.345 d
Method: Estimated.

Bioaccumulative potential

Hexamethylenediisocyanate trimer

Bioaccumulation: No relevant data found.

Hexamethylene diisocyanate

Bioaccumulation: Reacts with water. In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.
Bioconcentration factor (BCF): 58 Estimated.

Mobility in soil

Hexamethylenediisocyanate trimer

No relevant data found.

Hexamethylene diisocyanate

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

13. DISPOSAL CONSIDERATIONS

Disposal methods: Incinerate liquid and contaminated solids in accordance with local, state, and federal regulations. (See 40 CFR 268)

14. TRANSPORT INFORMATION

DOT

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

Not regulated for transport

Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

OSHA Hazard Communication Standard
This product is considered hazardous under the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
Acute Health Hazard
Chronic Health Hazard

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This product does not contain a chemical which is listed in Section 313 at or above de minimis concentrations.

Pennsylvania
Any material listed as “Not Hazardous” in the CAS REG NO. column of SECTION 2, Composition/Information On Ingredients, of this MSDS is a trade secret under the provisions of the Pennsylvania Worker and Community Right-to-Know Act.

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

Hazard Rating System
HMIS

Health	Flammability	Physical Hazard
2*	1	1

* = Chronic Effects (See Hazards Identification)

Revision
Identification Number: 101104980 / 1001 / Issue Date: 04/28/2015 / Version: 4.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
TWA	8-hour, time-weighted average

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

THE DOW CHEMICAL COMPANY* urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.