



Working safely with I-BOND MDI resins

Composite wood products



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Introduction

Please read this manual thoroughly. You play an active part in your own health and safety, as well as the health and safety of those around you. If you have questions or need more specific information beyond what is covered in this overview, please contact your company management first, then Huntsman Polyurethanes directly.

The polyurethanes division of Huntsman Corporation manufactures polyurethane chemical components and formulated systems around the world. For more than 40 years, we have worked to develop and produce diisocyanates that provide our customers with the materials they need to create superior products.

Methylene diphenyl diisocyanate (MDI) has been used commercially for many years. Our customers use MDI to make practical, energy-efficient, comfortable and affordable polyurethane products that you encounter every day. These include the foam seat cushions in your car, insulation in your home or office, the soles of your shoes, bowling balls and composite wood panels such as oriented strand board (OSB), as well as toys and many other items.

Your company has chosen to use I-BOND MDI in the manufacture of its products. And, since I-BOND MDI is a chemical, you need to know how to work with it safely and effectively.

At Huntsman, health, safety and the environment are our top priorities. We have developed a product stewardship program to ensure that you, and other employees at your company, know how to protect your wellbeing and the wellbeing of those around you.

This handbook provides an extensive review of I-BOND MDI and its properties, as well as detailed explanations of how to handle it safely. This health and safety package should complement your own company's safety program and help lead you to a full understanding of your responsibilities when working with I-BOND MDI. Topics reviewed in this handbook include:

- What I-BOND MDI is and how it is used
- Health and I-BOND MDI
- How to monitor the air for I-BOND MDI
- The proper personal protective equipment to wear when working with I-BOND MDI
- How to inspect your plant for I-BOND MDI
- What to do in case of spills, leaks or fire.

What is MDI and how is it used?

Durable, flexible and economical, polyurethanes are great performers. From design concept to finished product, polyurethanes are often the first choice in manufacturing useful consumer products. This innovative material has many applications:

- **Flexible foam:** soft cushioning for automotive seating, as well as residential and office furniture
- **Integral skin, semi-rigid and low-density structural reinforced foams:** automotive dashboards, steering wheels, head restraints, armrests, door substrates and other interior trim components
- **Elastomers:** hard-wearing, energy-absorbing soling for shoes and boots
- **High-density, structural, rigid foam:** tough, molded furniture and equipment
- **Lightweight, low-density rigid foam:** buoyancy aids in boats and flotation equipment
- **Rigid polyurethane foam:** thermal insulation and strength in construction; waterproofing for roofs, storage tanks and underground pipelines
- **Coatings, sealants and binders:** recycled rubber for running tracks and foundry cores; high-performance coatings
- **Composite wood products:** I-BOND MDI resins used as an adhesive to bond wood in Oriented Strand Board (OSB), Medium Density Fiberboard (MDF), Particleboard (PB) and Wood Fiber Insulation Board (WFI).



MDI-based polyurethanes: A customized mix

MDI-based polyurethanes are formed by an exothermic reaction between two chemicals – MDI and a polyol – in the presence of suitable catalysts and additives.

The most important feature of MDI-based polyurethanes is that product manufacturers can create a custom polyurethane to meet their specific design criteria, production capability and end-use product performance specifications.

The three forms of MDI

The MDI used to make polyurethanes is available in three basic compositions:

- Monomeric or 'pure' MDI
- Polymeric MDI
- Variants produced either from pure MDI or components of polymeric MDI.

Although the types of MDI differ chemically and physically, they require the same sensible approach to safe handling. For your information, we have included a chart of the typical properties of the various forms of MDI.



TYPES OF MDI			
Properties of MDI	Monomeric MDI	Polymeric MDI	Variants
Appearance	Liquid above 38.5°C	Viscous liquid	Viscous liquid
Color	White to pale yellow as a solid	Brown	Brown
Boiling point (EU A2 method)	>300°C (at ca. 1013hPa)	>300°C (at ca. 1013hPa)	>300°C (at ca. 1013hPa)
Flash point (EEC A9 method)	>200°C	>200°C	>200°C
Freezing / melting point	41 +/- 2 °C	5 °C; forms crystals below 10 °C	Varies
Viscosity	4.7 mPa.s @ 50°C	100-2000 mPa.s @ 25°C	100-2000 mPa.s @ 25°C
Specific gravity (EU A3 method)	1.33 @ 20°C	1.24 @ 20°C	1.15 - 1.23 @ 20°C
Vapor density (air = 1)	8.5	8.5	8.5
Vapor pressure	6.2 x 10 ⁻⁴ hPa @ 20°C	3.1 x 10 ⁻⁴ hPa @ 20°C	Varies



What is I-BOND MDI and how is it used?

Chemical reactions of I-BOND MDI

Our I-BOND MDI resins are used as an adhesive to bond wood in Oriented Strand Board (OSB), Medium Density Fiberboard (MDF), Particleboard (PB) and Wood Fiber Insulation Board (WFI).

Water

At below usual workplace temperatures and in the absence of catalysts, I-BOND MDI will react very slowly with water. At higher temperatures, the reaction becomes progressively faster.

More importantly, the reaction of I-BOND MDI with water forms carbon dioxide gas and polyureas, which are insoluble in water. Contamination of I-BOND MDI with water, while it is stored in a closed container, can lead to excessive pressure due to the carbon dioxide gas building up, which can eventually result in bursting or rupturing of the container.

Rubber and plastics

I-BOND MDI can degrade and cause cracks in some rubbers and plastics. Therefore, all personal protective equipment, as well as hoses used to transport I-BOND MDI, should be constructed of I-BOND MDI-resistant materials such as butyl rubber, nitrile rubber, Viton fluoroelastomer or Teflon coatings. Flexible stainless-steel hoses provide the best resistance to cracks and degradation and are recommended for permanent installations.

Metals

At room temperature, I-BOND MDI usually won't corrode metal. However, experience has shown that a small amount of acidity in polymeric I-BOND MDI may corrode copper alloys and galvanized surfaces.

Other materials

I-BOND MDI reacts with polyols and amines. Combined with these compounds, I-BOND MDI will cause an increased risk of burns, an increase in I-BOND MDI vapor and possibly the release of carbon dioxide gas. The reactions must take place in a controlled way under the correct circumstances.



Health and I-BOND MDI

Respiratory system

I-BOND MDI has a low vapor pressure; therefore, at room temperatures, it is not likely to have airborne concentrations at or above the occupational exposure limits from an open container of I-BOND MDI. However, when I-BOND MDI is heated, sprayed, or used in confined or poorly ventilated areas, airborne concentrations above the occupational exposure limits can occur.

Effective control measures must always be in place to reduce the risk of:

- Breathing I-BOND MDI vapor e.g. at the press area
- Breathing I-BOND MDI aerosol or fine I-BOND MDI-coated wood dust particles with unreacted MDI.

If repeatedly exposed to airborne concentrations above established exposure limits, some people may become sensitized to I-BOND MDI and subsequently develop occupational asthma.

Sensitization to any chemical or natural substance, such as pollen, is an immunological response of the body. The individual develops a heightened allergic response to the substance, which means that after sensitization, exposure to extremely low levels of the substance in question can trigger an allergic response, which can lead to an asthmatic effect.

Current occupational exposure levels are based on people with normal immunological responses. These exposure limits will not protect an individual who has become sensitized. Sensitized individuals and anyone prone to asthma should consult their physician or company doctor before working with I-BOND MDI, other diisocyanates and many other chemicals.

If inhalation exposure occurs, remove the person from exposure into fresh air and seek medical advice. First responders should always protect themselves prior to entering a potential exposure area.

Eyes

As a liquid, vapor or coated on wood particles, I-BOND MDI can irritate the eyes, causing watering or discomfort. To prevent eye contact, wear protective glasses or goggles when working with the product.

If I-BOND MDI gets into your eyes, rinse your eyes for at least 15 minutes with the contents of several sterile eye wash bottles or copious amounts of clean water, holding the eyelids apart. Obtain immediate medical attention.

Ingestion

While relatively non-toxic if accidentally swallowed, I-BOND MDI and I-BOND MDI-based compositions may produce symptoms of irritation in the gastrointestinal tract.

If you ingest I-BOND MDI, do not induce vomiting. If the patient is conscious, wash out the mouth with water. Do not swallow. Medical attention should be sought immediately.



Skin

Irritation or skin sensitization (manifested as a skin rash) may develop after repeated or prolonged skin contact with I-BOND MDI. A temporary brown skin discoloration may also occur. To prevent skin contact, wear impervious gloves (butyl, neoprene or nitrile rubber) and long-sleeved shirts as described in the SDS. If splashing is possible, wear a face shield. If skin contact occurs, contaminated clothing should be removed. The skin should immediately be washed thoroughly with copious amounts of clean, warm water and soap. Cold water can be used if warm water is not available. In a study sponsored by the International Isocyanate Institute (III), soap and water removed about 70% of MDI if washing was performed immediately after contact.

Washing effectiveness may be reduced by as much as half if washing occurs eight hours or more after contact. Some organic materials, such as propylene glycol or corn oil, can be more effective than soap and water, although they may be less readily available in the workplace.

Any contaminated clothing should be decontaminated and thoroughly cleaned or thrown away. Never take contaminated clothing home.

If redness or itching develops, seek medical attention. Symptoms can occur up to 24 hours after exposure.

Medical surveillance

Periodic medical examinations are vital for the early detection of any evidence of sensitization or respiratory irritation. The first examination should take place before you work with I-BOND MDI (pre-employment or baseline). It is recommended that these tests are repeated after six weeks and thereafter at six monthly intervals, or as local regulations indicate. Employees should also undergo medical surveillance following accidents or incidents where they may have experienced exposure above the Occupational Exposure Limit.

Usually, you will be asked to fill out a questionnaire and to take pulmonary function tests designed to screen individuals with any type of respiratory problems. Results may then be used to identify individuals who may need further evaluation by an occupational physician.

You should make all your responses honest and thorough. Making the correct diagnosis of occupational asthma is crucial. After sensitization has developed, very small concentrations of the chemical can provoke respiratory effects. Recovery from sensitization is not possible, only from the lung damage it causes.

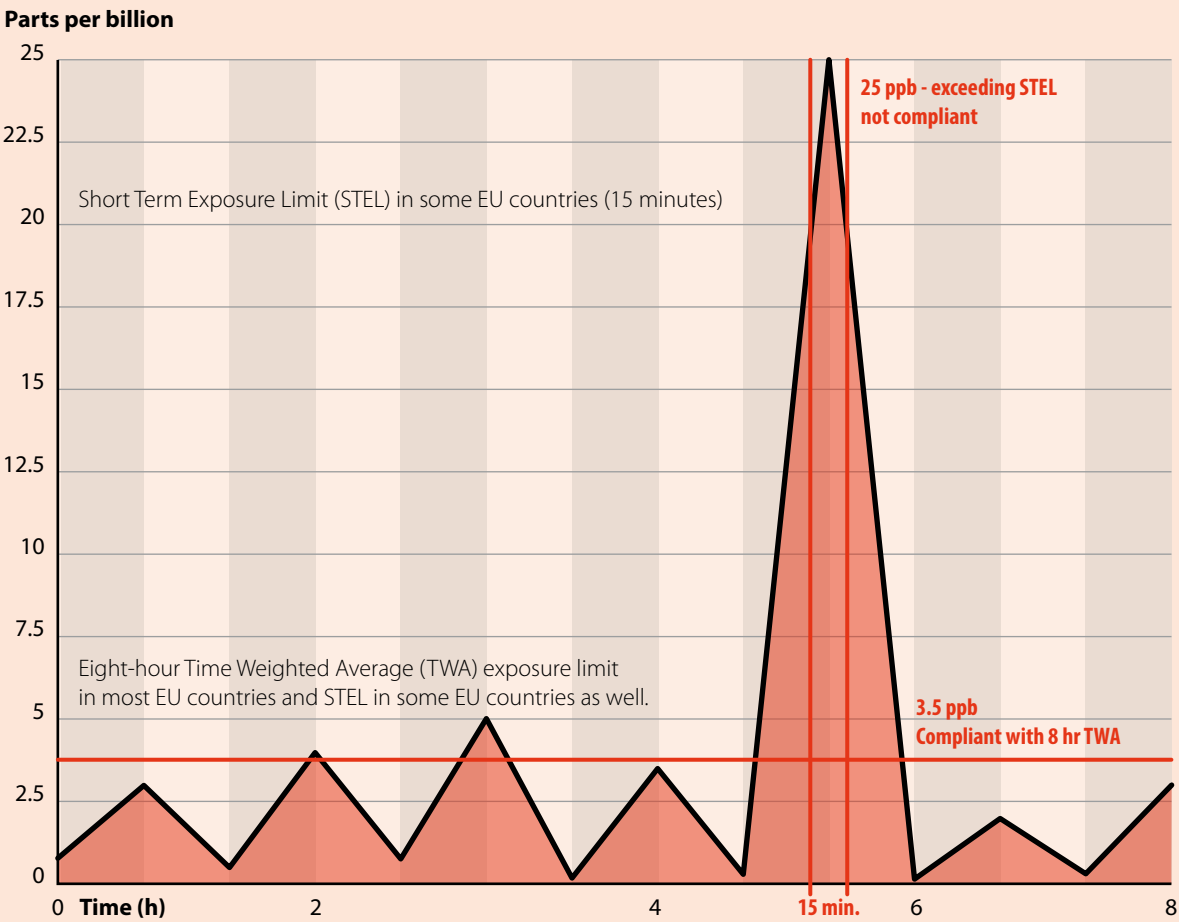
How to monitor the air for I-BOND MDI

Air monitoring is an important measurement for assessing potential workplace health exposure. The comprehensive monitoring of any plant at start- up, and periodically thereafter, is recommended. Whenever a process or engineering change has been made, your plant should follow through with monitoring and reassess if necessary. Each country has established exposure limits to protect workers from any adverse short- and long-term health effects of chemicals. The Occupational Safety and Health Administration (OSHA) collected all the exposure limits of EU countries. For non-EU member states please contact the occupational health organization in your region for up to date information.

The graph is not based on real data as the goal is to explain the differences between STEL, 8h OEL, etc.... 3.5ppb is the average over eight working hours.

Specific EU member states occupational exposure limit values can be retrieved at: <http://limitvalue.ifa.dguv.de/>

It must be a goal for every chemical user to keep airborne concentrations in the workplace as low as possible through technical control measures, such as adequate ventilation.



Please note that this graph shows the differences between STEL and 8-hour OEL. It is not based on real data.

Testing the air for I-BOND MDI

Effective control measures should be in place whenever I-BOND MDI is handled under conditions where I-BOND MDI can be present as a vapor, aerosol or dust when coated on wood particles. It is important that the effectiveness of controls used, such as local exhaust ventilation, personal protective equipment and work practices, are checked routinely. Monitoring can be performed to determine the presence of airborne concentrations of I-BOND MDI vapor, aerosol or I-BOND MDI-coated particulates.

Monitor for I-BOND MDI when:

- I-BOND MDI is used for the first time
- A new process is introduced
- An existing process is modified
- I-BOND MDI leakage (liquid or vapor) is suspected or is known to have occurred
- There are worker complaints.

Conduct evaluations on a regular basis.

Monitoring results should be compared to relevant exposure limits.

Many suitable monitoring methods are available for I-BOND MDI. Consult your management or a Huntsman Polyurethanes industrial hygienist for specific recommendations for your situation. Airborne concentrations of I-BOND MDI in a facility can vary considerably, depending on the process, the engineering controls and the work practices in place.

I-BOND MDI exposure limits

There are typically two exposure limits for hazardous substances:

> Time Weighted Average (TWA)

This is an exposure limit which protects a healthy individual against long-term health effects. This is the eight-hour exposure limit value or the airborne concentration of a substance to which it is believed that all workers may be exposed to without causing adverse health effects (eight-hours a day, five days a week, 40 years). This limit is a time weighted average value, which permits excursions above the limit, provided they are compensated with exposures below the limit, so that average exposure for the eight-hour working day remains below the eight-hour exposure limit.

Typical I-BOND MDI eight-hour time weighted average exposure limit is 0.05 mg/m³ or 5ppb v/v.

> Short Term Exposure Limited (STEL)

This is an exposure limit that protects a healthy individual in the short-term. It is typically based on a 15-minute exposure limit, referred to as Short-term Exposure Limit (STEL). The 15-minute limit value is the airborne concentration of substance to which it is believed that workers may be exposed to for a period of 15 minutes, for a maximum of four times a day and with 60 minutes in between exposures, without causing adverse health effects. The ceiling limit value is the maximum airborne concentration of a substance, which may never be exceeded. Typical I-BOND MDI STEL or ceiling limits can range from 0.05 mg/m³ or 5 ppb v/v to 0.20 mg/m³ or 20 ppb v/v.

EXPOSURES VARY DURING WORKDAY

Eight-hour

Parts per billion	0.75	3	0.5	4	0.75	5	0.2	3.5	0.3	25	0.15	2	0.3	3
Time	0	0.5	1.25	2	2.5	3	3.75	4.25	5	5.5	6	6.75	7.25	8



Personal Protective Equipment (PPE) for working with I-BOND MDI

Effective risk reduction measures should be in place whenever I-BOND MDI is handled. The priority should be to minimize exposure by using appropriate engineering measures, including enclosure and the provision of suitable ventilation, rather than to rely on personal protective equipment.

Wearing and using proper personal protective equipment during different situations enables you to protect yourself against possible exposure to I-BOND MDI. Good industrial hygiene and safe work practices require excellent ventilation. This reduces the probability of exposure to airborne I-BOND MDI aerosol, dust, vapor, or I-BOND MDI-coated particulates above exposure limits.

Standard protective equipment

In routine working situations, the following types of equipment should be used when handling I-BOND MDI:

- Long-sleeved coveralls (preferably heavy cotton)
- Safety glasses or goggles
- MDI resistant gloves (e.g., neoprene, nitrile or butyl rubber, see SDS)
- Safety shoes (to protect against the accidental dropping of heavy loads).

Always check personal protective equipment before use to see that it is in good condition. I-BOND MDI tends to harden some rubbers and plastics. This increases the risk of damaging the gloves. Replace gloves if they are contaminated or on a daily basis / after use. Never re-use contaminated clothing or gloves.

Respirator use is essential in situations where work practices and engineering controls alone cannot reduce MDI exposure levels below exposure limits, for example:

- During maintenance, repair work
- When there is a risk that I-BOND MDI might be present in the air as:
 - Vapor, when I-BOND MDI is heated
 - An aerosol, while / after spraying
 - Dust or coated on wood particles.
- In poorly ventilated areas, when ventilation system designs are not adequate, or ventilation is not efficient.

In all of the above situations, a half-face or full-face respirator with an A(BEK) (2) cartridge with P2 or P3 dust filter is required. When entering a confined space, like blenders, air supplied respiratory equipment must be used.

Specialist advice should be obtained in selecting the best form of Respiratory Protective Equipment (RPE) for a particular situation or task. RPE is covered by regulations in many countries and there are well defined standards, referring to sizing, fit tests and face seal leakage. Incorrectly fitted, incorrectly used or incorrectly maintained RPE will not provide adequate protection.

Transfer operations

The best way to transfer liquid I-BOND MDI to fill machine tanks is through a closed system, such as immersion transfer pumps. If I-BOND MDI is to be poured, be sure the area is well ventilated.

Always wear:

- MDI resistant gloves (butyl, neoprene or nitrile rubber)
- Eye protection
- Long-sleeved coveralls.

An appropriate respirator should also be worn if the I-BOND MDI has been heated, or if an aerosol, or I-BOND MDI coated wood particles might be produced during handling.

Air-purifying respirators equipped with organic vapor cartridges and a high efficiency particulate filter (P2 or P3) may be used under certain conditions when a cartridge change-out schedule has been developed.

Emergency protective equipment

Full protective equipment is required in emergency situations. For example, when dealing with a big spillage. Full protective equipment consists of:

- A chemical suit or an impermeable overall with hood
- Impermeable gloves
- Impermeable boots
- Respiratory equipment i.e. a full face self-contained breathing apparatus (SCBA) or with auxiliary self-contained air supply (SAR).

Since emergency equipment will be used very infrequently, it is important that training is provided on a regular basis. Respirators for emergency use should be maintained regularly. There are guidelines defining the frequency of maintenance.

All types of chemical protective clothing should be resistant to I-BOND MDI.

The supplied air respirator should have its own independent air supply or be connected to a compressed air supply capable of providing grade D breathing air.

It is important to keep the breathing apparatus available near any bulk storage of I-BOND MDI, as well as outside the storage area, so that it is easily accessible in case of a spill.

It is highly recommended not to wear respirators when conditions prevent a good face seal. Such conditions may include a beard, sideburns, a skullcap that projects under the face piece, or temple pieces on glasses. All workers must be trained in the use of such masks and masks must be fit tested. The site doctor should give final approval.

How to inspect your plant for I-BOND MDI

Delivery and storage

Bulk storage

I-BOND MDI is usually delivered by road tanker or by rail car. Before delivery, bulk storage tanks should be inspected to make sure that they are clean, dry and have sufficient capacity to hold the contents of the road tanker or rail car.

Bulk storage tanks should be separated from the working area by a fire-resistant wall. Tanks should be surrounded by a retaining wall capable of holding 110% of the contents of the largest tank, should it rupture. I-BOND MDI tanks should be separated from other chemical tanks by a retaining wall.

Machinery

Regularly inspect your machinery by checking valves and joints. Stop any leaks immediately and thoroughly clean the affected valves and joints before reassembly. Install drip trays containing solid absorbent under faulty valves or joints.

I-BOND MDI tends to harden and damage certain types of rubber and plastic. When purchasing and installing new equipment, ensure that all parts, such as valves, pumps and hoses, are compatible with I-BOND MDI (stainless steel is preferred).

Decontaminants for I-BOND MDI

You can use liquid decontaminants to “neutralize” I-BOND MDI and convert the NCO-groups and hence minimize exposure to humans and the environment. They are used in the case of a spillage of I-BOND MDI or making equipment safe for maintenance or repair. Supplies of decontaminant should be labelled clearly and should be available both inside and outside the areas where I-BOND MDI is used, so that they are on hand for minor spillages or can be brought in for major spillages.

When using a decontaminant, there are several things to remember:

- Refer to the supplier’s Safety Data Sheet (SDS) when preparing and using decontaminant solutions
- Always dispose of your protective gear when it has become contaminated with I-BOND MDI residue
- Always decontaminate or dispose of machinery parts, equipment and tools (such as buckets, temporary containers and funnels) used in the handling or mixing I-BOND MDI.

The decontaminants shown in the chart below are the best for treating minor spills and cleaning equipment. The ratio of decontaminant solution to I-BOND MDI should be approximately 10:1.



Container storage (Integrated Bulk Container or IBC)

Inspect bulk containers for damage that may have occurred during transit and ensure the integrity of outlet fittings, vents and seals. Containers may be handled using a fork-lift truck with an appropriate fork arm length and lifting capacity. Only lifting equipment with a safe-holding device and appropriate lifting capacity should be used.

IBCs should be stored under cover, stacked no more than three high. The storage area should be surrounded by a bunded area capable of containing 110% of the contents of the largest IBC.

Discharge must not be carried out under pressure or vacuum. Care must be taken to prevent atmospheric moisture entering the IBC when the product is removed.

Copper and copper alloy containers, and those with galvanized surfaces, are unsuitable for the storage of I-BOND MDI. Containers should be made of stainless steel or mild steel.

Clean work practices

- Decontaminate and clean mixing machinery parts and equipment that was used while handling I-BOND MDI
- Clean hose lines and leave them sealed with plugs or non-return valves
- Close containers to prevent vapor from escaping or moisture from entering
- Observe good manufacturing and handling practices; there should be no smoking, drinking or eating while handling chemicals
- Inspect your personal protective equipment regularly.

Liquid decontaminants for I-BOND MDI

SODIUM CARBONATE-BASED	% BY WEIGHT OR VOLUME
Sodium carbonate ¹	5 - 10%
Liquid detergent	0.2 - 2%
Water	To make up to 100%
AMMONIA-BASED	% BY WEIGHT OR VOLUME
Concentrated ammonia solution ^{1, 2}	3 - 8%
Liquid detergent	0.2 - 2%
Water	To make up to 100%

¹ Refer to supplier's SDS.
² Concentrated ammonia solutions are irritating and corrosive to body tissue. Care should be exercised.

Solid decontaminants for I-BOND MDI

Solid decontaminant is always used to contain, adsorb and neutralize I-BOND MDI in major spillages. Mix liquid decontaminant with a non-flammable absorbent carrier such as sand, clay or sawdust. Generously apply to spills with a shovel to contain, absorb and neutralize I-BOND MDI.

Equipment maintenance

Workers responsible for maintenance may not be familiarized with handling I-BOND MDI in a safe way. All workers must ensure each other's safety by cleaning contaminated parts of machinery or equipment with decontaminant. Breathing apparatus should be used where the ventilation may be restricted, e.g. where repairs are carried out on pipes between bulk storage and machine tanks or in confined areas.

Waste disposal

The following methods of waste disposal are safe and effective. However, always consult current local, state and federal regulations before starting.

Disposal of emptied containers

Drums and non-returnable totes are one-way containers. Dispose correctly after complete decontamination of any I-BOND MDI residues. Always drain decontamination containers in a properly ventilated area. Be sure that all personnel are protected from I-BOND MDI vapors. Strictly observe the exposure limits for I-BOND MDI.

Below is the procedure to follow for decontaminating emptied (less than three centimeters of I-BOND MDI residue) and well-drained I-BOND MDI drums:

- 1:** Prepare the decontamination solution while wearing the correct PPE and check if the drum is really drained and empty by weighing it.
- 2:** Cautiously open the 2" bung of the drum, which has been emptied by draining, after having assured adequate ventilation. A slight internal pressure may be present in the drum as a result of thermal fluctuations.
- 3:** Pour five liters of the decontamination solution into the drum, unless the drum still contains more than one liter of product.
- 4:** Close the bung hole firmly, place the drum on its side and roll it at least four times, place it upside down for a moment and turn it again to its upright position.
- 5:** A slight overpressure will occur in the drum due to the chemical reaction that has started. Release the 2" bung without removing it to prevent any pressure build-up¹.
- 6:** Repeat steps four and five.
- 7:** After two hours repeat steps four and five, three times.
- 8:** After one day, mix the solid with the liquid inside the drum thoroughly.
- 9:** Repeat step eight for the next two days (drum should be stored at temperatures > 20 °C to ensure complete reaction).
- 10:** Decant liquid and separate from the solid. The liquid should be stored in an extra drum and used for the decontamination of the next drum.
- 11:** Keep the drum under a cover to stand for at least one week. Label as decontaminated drum.

CAUTION: Under no circumstances can you use drums that have contained I-BOND MDI for any other purpose before they have been recycled by an approved reconditioner.

¹ Don't leave the drum closed for more than a few minutes, otherwise the pressure-build up may rupture the drum.



Disposing of a small quantity of I-BOND MDI

Small quantities, such as those which arise when calibrating machinery, can be disposed of by:

1. Collecting and reworking in I-BOND MDI if the reaction of the MDI did not start and there is no cross contamination with other MDI types.
2. Sending to a waste incineration / waste collection organization.

Disposing of a large quantity of I-BOND MDI waste

Ideally, large quantities of BOND MDI waste should not be allowed to accumulate. If, however, large quantities have accumulated, Huntsman should be contacted in the first instance, as it may be possible to reclaim the product for recycling. Where large quantities have to be disposed of, drums of material should be handled by authorized waste disposal specialists for incineration, using equipment specifically designed for the burning of noxious waste.



In case of spills, leaks or fire

Spills and leaks

Accidental releases should only be cleaned up by trained personnel wearing the correct personal protective equipment. From minor incidents that occur in the lab to major ones that involve a tank container or rail cars. These are the main objectives when handling any type of spill:

- Protect workers
- Contain the spill
- Neutralize the spilled I-BOND MDI.

When in doubt as to the severity of the situation, assume a worst-case scenario and react accordingly.

Major spills

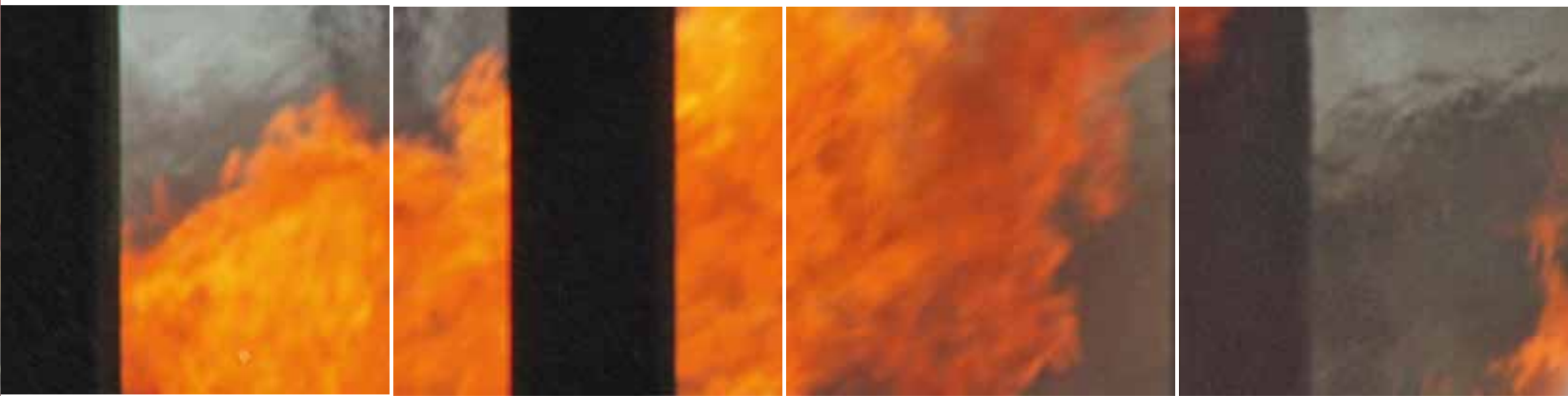
1. Major spills must always be dealt with by trained personnel using full emergency protective equipment including breathing apparatus.
2. Evacuate the area and keep upwind to avoid inhalation of vapor.
3. Prevent further leaks or spills.
4. Contain the spillage by absorbing it onto sand, earth or any suitable adsorbent material, wetted out with decontaminant solution to expedite the process. Care should be taken to ensure that I-BOND MDI does not enter drains, since the reaction with water produces an insoluble material, which could cause the drains to block. If I-BOND MDI enters the drains, it should be flushed away with copious quantities of water to minimize the risk of blockage.
5. Leave the material to adsorb for at least 30 minutes.
6. Shovel into open-top drums for further decontamination. Do not seal the container as the contents may give off carbon dioxide.
7. Dispose of decontaminated material in accordance with local / national regulations.
8. Wash the area well with liquid decontaminant and inspect thoroughly.
9. Test the atmosphere for I-BOND MDI vapor (for example, using the paper tape method) to ensure that safe working conditions prevail before other personnel are allowed into the area).



Minor spills and leaks

For minor spills, e.g. such as in a laboratory or in a testing environment:

1. Wear overalls, eye protection, gloves and safety shoes.
2. Avoid inhalation of vapor.
3. Neutralize the spillage with decontaminant.
4. Leave the material to react for 30 minutes.
5. Remove and dispose of residues in accordance with local / national regulations.



Fire

Diisocyanates have high flash points, usually in the range of 200°C – 250°C, and they are not readily ignited below 600°C. They are not classified as flammable. However, if heated sufficiently, they will burn and emit noxious and toxic fumes. Combustion products may include carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and hydrogen cyanide. Containers can burst if they are overheated.

In case of fire

1. Personnel located downwind must be evacuated.
2. If the fire does not involve I-BOND MDI but is close to it, use an extinguisher appropriate to the type of fire.
3. If the I-BOND MDI itself is on fire, the following extinguishers may be used: dry chemical powder, carbon dioxide or foam.
4. Water should only be used if no other suitable method of fighting the fire is available and copious quantities should then be used. The reaction between water and hot diisocyanate may be vigorous. Do not discharge extinguishing waters into the aquatic environment.
5. Containers exposed to fire should be kept cool by spraying them with water.
6. After the fire has been extinguished, the area should not be considered safe until a thorough inspection for remaining I-BOND MDI has been carried out by properly-protected personnel.
7. Any suspect residues found should be rendered safe; treat as a spillage. The atmosphere should be tested for I-BOND MDI.

First aid & emergency response

Skin

Immediately remove contaminated clothing and wash the skin thoroughly with plenty of warm, clean water and soap or with corn-oil. Any contaminated clothing should be decontaminated and thoroughly cleaned or, preferably, disposed of.

If symptoms occur, obtain immediate medical attention.

Eyes

- Force the eyelids wide open
- Rinse with plenty of water for at least 15 minutes
- Continue rinsing, if you are in doubt
- Consult an eye specialist as soon as possible.

Medical attention should be sought immediately.

Ingestion

- Do not induce vomiting
- If the patient is conscious, wash out the mouth with water
- Do not allow the person in question to swallow the water.

Medical attention should be sought immediately.

Inhalation

- Go outside the area of exposure and into fresh air
- A doctor must be called or the patient must be taken to a medical facility.

If breathing has ceased or shows signs of failing, artificial respiration should be applied.



Emergency phone numbers

In all cases of acute exposure, always seek medical advice and take the Safety Data Sheet (SDS) with you. Contact Huntsman who can provide supporting information via:

Europe	+32 35 75 1234
USA	+1 800 424 9300
Asia	+65 6542 9595
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