

Material Safety Data Sheet

FAST Adhesive Box Set Part A

MSDS No. 302911A

Date of Preparation: 07/20/07

Revision: 004

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: FAST Adhesive Box Set Part A

Chemical Name: Polymeric Diphenylmethane Diisocyanate

Chemical Formula: Mixture

General Use: Spray Adhesive

Manufacturer: Carlisle SynTec Incorporated, 1285 Ritner Highway, Carlisle, PA 17013, Phone: 800-4SYNTEC

Emergency Phone Number: CHEMTREC (USA) 800-424-9300

Section 2 - Composition / Information on Ingredients

Ingredient Name	CAS Number	% wt or % vol
4,4' Diphenylmethane Diisocyanate (MDI)	101-68-8	30-60
Polymeric Diphenylmethane Diisocyanate (polymeric MDI)	9016-87-9	30-60
Other MDI Isomers and Oligomers	26447-40-5	<10
1,1,1,2-Tetrafluoroethane Compressed Gas	811-97-2	10-30

Hazardous Ingredients:

Ingredient	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH IDLH
	TWA	CEIL	TWA	STEL	TWA	STEL	
4,4' Diphenylmethane Diisocyanate (MDI)	0.005 ppm	0.02 ppm	0.005 ppm (8 hr., 40 hr/wk)	None estab.	0.005 ppm (10 hr, 40 hr/wk)	0.02 ppm (15 min)	75 mg/m ³

Section 3 - Hazards Identification

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Potential Health Effects

Primary Entry Routes: Inhalation, skin contact, eye contact, ingestion.

Target Organs: Respiratory tract, skin, eyes.

Acute Effects

Inhalation: MDI vapors or mist at concentrations above the TLV can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with a pre-existing, non-specific bronchial hyperactivity can respond to concentrations below the TLV with similar symptoms as well as asthma attack or asthma-like symptoms. Acute or chronic overexposure to isocyanates may cause sensitization in some individuals, resulting in allergic respiratory reactions including wheezing, shortness of breath and difficulty breathing. Airborne overexposure, well above the TLV, may lead to eye irritation, headache, chemical bronchitis, asthma-like findings, bronchial spasm and pulmonary edema (fluid in lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (e.g., fever, chills) has also been reported. These symptoms can be delayed up to several hours after exposure. Overexposure to 1,1,1,2-Tetrafluoroethane may cause lightheadedness, headaches, or lethargy. Persons with cardiac arrhythmia may be at increased risk to severe exposure

Eye: Liquid, aerosols or vapors are irritating and can cause tearing, reddening and swelling. Eye contact with isocyanates may also result in conjunctival irritation and mild corneal opacity. If left untreated, corneal damage can occur and injury is slow to heal. However, damage is usually reversible. Vapor or aerosol may cause irritation with symptoms of burning and tearing.

Skin: Isocyanates react with skin protein and moisture and can cause irritation, which may include the following symptoms: reddening, swelling, rash, scaling or blistering. Skin sensitization, irritation, and/or dermatitis (irritative or allergic) may develop after repeated and/or prolonged contact with human skin. Data derived from an animal model (guinea pig) demonstrate that dermal exposure to MDI can lead to respiratory sensitization. The data indicate that the greater the amount of MDI skin exposure, the greater risk of developing respiratory sensitization. Cured material is difficult to remove. Contact with MDI can cause discoloration.

Ingestion: Can result in irritation and corrosive action in the mouth, pharynx, stomach tissue and digestive tract. Symptoms can include sore throat, abdominal pain, nausea, vomiting and diarrhea. Acute oral LD50 in rat reported above 10,000 mg/kg.

Carcinogenicity: IARC, NTP, and OSHA do not list this product as a carcinogen.

Medical Conditions Aggravated by Long-Term Exposure: Individuals, who are sensitized to Isocyanates and those with preexisting lung diseases or conditions, including non-specific bronchial hyper reactivity or asthma, must avoid all exposure to isocyanates. Skin allergies and Eczema.

HMIS

H 2*

F 1

R 1

PPE†

*Chronic Health Hazard

†Sec. 8

Chronic Effects:

Inhalation: As a result of previous repeated overexposure or a single large dose, certain individuals develop isocyanate sensitization (chemical asthma), which will cause them to react to a later exposure to isocyanate at levels well below the TLV. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthma attack, could be immediate or delayed (up to several hours after exposure). Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Overexposure to isocyanates has also been reported to cause lung damage (including decrease in lung function), which may be permanent. Sensitization can either be temporary or permanent.

Skin: Prolonged contact can cause reddening, swelling, rash, scaling, blistering and in some cases, skin sensitization. Individuals who have skin sensitization can develop these symptoms from contact with liquid or vapors. Animal tests have indicated that respiratory sensitization can result from skin contact with MDI. This data reinforces the need to prevent direct skin contact with MDI.

Eye: Prolonged vapor contact may cause conjunctivitis.

Section 4 - First Aid Measures

Inhalation: Remove victim to fresh air and provide oxygen if breathing is difficult. Asthmatic symptoms may develop and may be immediate or delayed up to several hours. Extreme asthmatic reactions can be life threatening. Get medical attention.

Eye Contact: Immediately flush eyes with water for at least 15 minutes. Use lukewarm water if possible. Use fingers to ensure that eyelids are separated and that the eye is being irrigated. Get medical attention.

Skin Contact: Immediately remove contaminated clothing and shoes and wash skin with soap and water or corn oil. Wash contaminated clothing before reuse. If redness, itching, or a burning sensation develops, have skin examined and treated by medical personnel.

Ingestion: If swallowed, consult a physician immediately. Do not induce vomiting. Wash out mouth with water. If swallowed dilute with water. Do not give anything by mouth to an unconscious person.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians:

Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation as needed. Workplace vapors could produce reversible corneal epithelial edema impairing vision.

Skin: This compound is a skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn.

Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of the compound.

Inhalation: Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material should be removed from further exposure to any diisocyanate.

Special Precautions/Procedures: Whenever possible, remove the worker from the source of contamination.

Section 5 - Fire-Fighting Measures

Flash Point: 198.9°C, Pensky-Martens closed cup
218°C (425°F), Open Cup

Burning Rate: Not Established

Autoignition Temperature: 240°C (464°F)

LEL: Not available.

UEL: Not available.

Flammability Classification: Class III B Combustible Liquid.

Extinguishing Media: Dry chemical, carbon dioxide, high expansion chemical foam, or water spray for large fires. If water is used, use very large quantities, as the reaction between water and hot isocyanate may be vigorous.

Unusual Fire or Explosion Hazards: At temperatures greater than 204°C, polymeric MDI can polymerize and decompose which can cause pressure build-up in closed containers. Explosive rupture is possible. Therefore, use cold water from a safe distance to cool fire-exposed containers. Water contamination of liquid will produce carbon dioxide. Do not reseal open containers if they are contaminated with water, since pressure build-up may rupture the container.

Hazardous Combustion Products: Carbon monoxide, carbon dioxide oxides of nitrogen, traces of HCN, MDI vapors or aerosols.

Fire-Fighting Instructions: Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by firefighters. During a fire, MDI vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion. Do not release runoff from fire control methods into sewers or waterways. Avoid contact with the product and decontaminate equipment and protective clothing prior to reuse.

Fire-Fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full-face piece operated in pressure-demand or positive-pressure mode. NFPA compliant helmet, hood, boots and gloves should also be worn.



Section 6 - Accidental Release Measures

Spill /Leak Procedures: Evacuate and ventilate spill area. Remove ignition sources. Control the source of the leak. Dike spill to prevent entry into water system or soil. Wear full protective equipment including respiratory equipment during clean-up.

Small Spills: Absorb isocyanates with sawdust or other absorbent, shovel into suitable unsealed containers, transport to well-ventilated area (outside) and treat with neutralizing solution. Add about 10 parts of neutralizer per part of isocyanate, with mixing. Allow container to stand uncovered for 48 hours to let CO₂ escape. Cleanup spill area by scrubbing with decontaminate solution and letting it stand for 15 minutes. Clean up with suitable absorbent and place in uncovered container for 48 hours to let CO₂ escape.

Large Spills: If temporary control of isocyanate vapor is required, a blanket of protein foam or other suitable foam (available at most fire departments) may be placed over the spill. Large quantities may be pumped into closed, but not sealed, container for disposal.

Containment: For large spills, dike far ahead of liquid spill for later disposal. Do not release into sewers or waterways.

Cleanup: Decontaminate floor with decontamination solution letting stand for at least 15 minutes.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Additional Spill Procedures and Neutralization:

Neutralization Solutions:

- (1) A mixture of 75% water, 20% non-ionic surfactant (e.g. Poly-Tergent SL-62, Tergitol TMN-10) and 5% n-propanol.
- (2) A mixture of 80% water, 20% non-ionic surfactant (e.g. Poly-Tergent SL-62, Tergitol TMN-10).
- (3) A mixture of 90% water, 8% ammonium hydroxide or concentrated ammonia, and 2% liquid detergent.
- (4) A mixture of 90% water, 8% sodium carbonate and 2% liquid detergent.

Section 7 - Handling and Storage

Handling Precautions: Do not breathe vapors, mists or dusts. Use adequate ventilation to keep airborne isocyanate levels below the exposure limits. Wear respiratory protection if material is heated, sprayed, used in a confined space or if the exposure limit may be exceeded. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent overexposure from inhalation. This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposure to lower concentrations. Individuals with lung or breathing problems or prior allergic reactions to isocyanates must not be exposed to vapor or spray mist. Avoid contact with skin and eyes. Wear appropriate eye and skin protection. Wash thoroughly after handling. Do not breath smoke or gases created by overheating or burning this material. Decomposition products can be highly toxic and irritating.

Storage Requirements: Store in dry, well-ventilated area between 60-90°F (15-32°C), in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Do not breathe aerosols or vapors. Do not allow material to freeze (storage below 0°F for 3 days). Low temperature exposure does increase liquid viscosity, requiring the material to be restored to room temperature prior to use.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls:

Ventilation: Local exhaust should be used to maintain levels below the TLV whenever MDI is processed, heat or spray applied. Standard reference sources regarding industrial ventilation (i.e., ACGIH Industrial Ventilation) should be consulted for guidance about adequate ventilation. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls:

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134). Concentrations greater than the TLV or PEL can occur when MDI is sprayed, heated or used in a poorly ventilated area. **In such cases or whenever concentrations of MDI exceed the TLV or are not known, respiratory protection MUST be worn. Use NIOSH or MSHA approved respirator for organic vapors with a pre-filter or a supplied airline respirator (SAR).** For emergency, non-routine operations (cleaning spills, reactor vessels, or storage tanks), where levels are unknown or where concentrations are Immediately Dangerous to Life or Health (IDLH) select and use an appropriate positive pressure air supplying respirator (airline or self-contained breathing apparatus (SCBA)). **Warning! Air purifying respirators do not protect workers in oxygen-deficient atmospheres.** When the atmospheric levels may exceed the occupational exposure limits (PEL or TLV) approved air-purifying respirators equipped with an organic vapor absorbent and particulate filter can be used as long as appropriate precautions and change out schedules are maintained. MDI has poor warning properties since the concentration at which MDI can be smelled is substantially higher than the maximum exposure limit. If respirators are used, OSHA requires a written respiratory protections program that includes at least: medical certification, training, fit testing, periodic environmental monitoring, maintenance, inspection, cleaning and convenient, sanitary storage areas.

Hazardous Ingredients:

4,4' – Diphenylmethane Diisocyanate	
ACGIH TLV	0.005 ppm (8 hr, 40 hr/week)
OSHA PEL CEILING	0.02 ppm
NIOSH TLV	0.005 ppm (10 hr, 40 hr/week)
NIOSH STEL	0.02 ppm (15 minute)

NOTE: The Occupational Exposure Limits listed for isocyanates do not apply to previously sensitized individuals.

Protective Clothing/Equipment:

Hand Protection: Hycron, Nitrile or other permeation resistant gloves are required when handling the material directly or during its application. Butyl rubber, neoprene and PVC are also effective gloves.

Eye Protection: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are NOT eye protective devices. Vapor resistant goggles should be worn when contact lenses are in use. In a splash hazard environment, chemical goggles should be used in combination with a full face-shield.

Skin and Body Protection: Industrial shoes to protect feet from contact with product. Long sleeves, long trousers to protect skin from contact with product. Protective skin creams or emollients useful.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Physical and Chemical Properties

Physical State: Liquid.

Appearance: Dark brown.

Odor: Slight musty odor or aromatic

Vapor Pressure: Contents under pressure have vapor pressure greater than 50 psig (345 Kpa).
Less than 0.0001 mm Hg at 25 °C

Vapor Density (Air=1): 8.5 for MDI

Density: 10.3 lbs/gallon

Specific Gravity (H₂O=1, at 4 °C): 1.24 @ 25°C

Water Solubility: Not soluble-reacts slowly with water to liberate CO₂ gas.

Boiling Point (°C): 208°C(406°F) @ 5mm Hq for MDI
-26.2°C (15°F) for 1,1,1,2-TFE

Freezing/Melting Point (°C): Below 0°C (32°F) for MDI

Viscosity: 200 cps @ 20°C

VOC (gpl): Negligible

Section 10 - Stability and Reactivity

Stability: Stable at room temperature in closed containers under normal storage and handling conditions.

Polymerization: May occur. Contact with moisture, alkalines, tertiary amines, metal compounds or other products, which react with isocyanates, or temperatures above 160°C, may cause polymerization.

Chemical Incompatibilities: Water, amines, strong bases, alcohols. Will cause some corrosion to copper alloys and aluminum.

Conditions to Avoid: High temperatures above 160°C and freezing.

Hazardous Decomposition Products: By high heat and fire: Carbon monoxide, carbon dioxide, oxides of nitrogen, dense black smoke, isocyanate, isocyanic acid, traces of HCN, MDI vapors or aerosols.

Section 11- Toxicological Information

Toxicity Data:

Eye Effects: The aerosol, vapor or liquid will irritate human eyes following contact.

Skin Effects: Moderate irritant. Repeated and/or prolonged contact may cause skin sensitization. Animal studies have shown that respiratory sensitization can be induced by skin contact with known respiratory sensitizers including diisocyanates. These results emphasize the need for protective clothing including gloves to be worn at all times when handling these chemicals or in maintenance work.

Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH or IARC, not regulated as carcinogens by OSHA, and not listed as carcinogens by NTP.

Mutagenicity: There is no substantial evidence of mutagenic potential.

Teratogenicity: There is no substantial evidence of teratogenic potential. Fetotoxicity seen only with maternal toxicity

Acute Inhalation Effects:

Rat, inhalation, TC_{Lo} : 490 mg/m³ per 4 hours (respirable aerosol)

Acute Oral Effects:

Rat, oral, LD50: >2000 mg/kg

Chronic Effects: A study where groups of rats were exposed for 6 hours/day, 5 days/week for a lifetime to atmospheres of respirable polymeric MDI aerosol. Overall, the tumor incidence, both benign and malignant, and the number of animals with tumors were not different from controls. Only at the top level (6 mg/m³), there was a significant incidence of a benign tumor of the lung (adenoma) and one malignant tumor (adenocarcinoma). There were no lung tumors at 1 mg/m³. The increased incidence of lung tumors is associated with prolonged respiratory irritation and concurrent accumulation of yellow material in the lung, which occurred throughout the study. In the absence of prolonged exposure to high concentrations leading to chronic irritation and lung damage, it is highly unlikely that tumor formation will occur.

Section 12 - Ecological Information

Ecotoxicity:

Acute and Prolonged Toxicity to Fish:

LC0: > 1,000 mg/L (Zebra fish (*Brachydanio rerio*), 96 hrs)

LC0: > 3,000 mg/L (Killifish (*Oryzias latipes*), 96 hrs)

Acute Toxicity to Aquatic Invertebrates:

EC50: > 1,000 mg/L (Water flea (*Daphnia magna*), 24 hrs)

Toxicity to Aquatic Plants:

NOEC: 1,640 mg/L, End Point: growth (Green algae (*Scenedesmus subspicatus*), 72 hrs)

Toxicity to Microorganisms:

EC50: > 100 mg/L, (Activated sludge microorganisms, 3 hrs)

Environmental Fate:

Biodegradation: 0%, Exposure time: 28 Days. Material is expected to degrade only very slowly. Fails to pass OECD modified MITI test: hydrolysis products degrade slowly.

Bioaccumulation: Rainbow trout, Exposure time 112 days, < 1 BCF. Does not bioaccumulate.

Soil Absorption/Mobility: Movement in the environment is expected to be limited by the formation of insoluble polymers.

Section 13 - Disposal Considerations

Disposal:

Disposal Regulatory Requirements: Waste must be disposed of in accordance with Federal, State, Provincial and local environmental control regulations. Incineration is the preferred method. Empty containers must be handled with care due to product residue.

Container Cleaning and Disposal: Decontaminate containers prior to disposal. Empty decontaminated containers should be crushed to prevent reuse. Do not heat or cut empty containers with electric or gas torch. Gases may be highly toxic.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Shipping Name: Compressed gas n.o.s. (1,1,1,2 Tetrafluoroethane)

Shipping Symbols: G

Hazard Class: 2.2

ID No.: UN 1956

Packing Group:

Label: Class 2.2

Special Provisions (172.102):

Packaging Authorizations

a) Exceptions: 173.306, 173.307

b) Non-bulk Packaging: 173.302, 173.305

c) Bulk Packaging: 173.314, 173.315

Quantity Limitations

a) Passenger, Aircraft, or Railcar: 75 kg

b) Cargo Aircraft Only: 150 kg

Vessel Stowage Requirements

a) Vessel Stowage: A

b) Other:

Section 15 - Regulatory Information

EPA Regulations:

RCRA Hazardous Waste Number: Not listed (40 CFR 261.33)

RCRA Hazardous Waste Classification (40 CFR 261.11): MDI is not listed as a hazardous waste. However, under RCRA, it is the responsibility of the user of products to determine, at any time of disposal, whether a product meets any of the criteria for hazardous waste.

CERCLA Hazardous Substance (40 CFR 302.4) listed specific per RCRA, Sec. 3001; CWA, Sec. 311 (b)(4); CWA, Sec. 307(a), CAA, Sec. 112

CERCLA Reportable Quantity (RQ),

4,4' Diphenylmethane diisocyanate = 5,000 lbs

SARA 311/312 Codes:

Immediate Health Hazard, Delayed Health Hazard, Reactive Hazard, Acute Health Hazard, Chronic Health Hazard

SARA 313 Toxic Chemical (40 CFR 372.65):

Polymethylene polyphenyl isocyanate CAS Number: 9016-87-9 100%

Methylenebis (phenylisocyanate) (MDI) CAS Number: 101-68-8 ca 50%

SARA 302 EHS (Extremely Hazardous Substance) (40 CFR 355):

Not listed, Threshold Planning Quantity (TPQ)

TSCA Status

On the TSCA inventory

1,1,1,2 Tetrafluoroethane – TSCA flags: S

OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Not listed

OSHA This product is hazardous under the criteria of the Federal OSHA Communication Standard (29CFR 1910.1200)

State Regulations:**California Proposition 65:**

This product contains the following chemical(s) known to the state of California to cause cancer, birth defects or other reproductive harm: None

Delaware Air Quality Management List

<u>Chemical Name</u>	<u>CAS Number</u>	<u>DRQ</u>
Methylenebis(phenylisocyanate)	101-68-8	5000

Note: Must be reported to the DRQ

Polymeric diphenylmethane diisocyanate	9016-87-9	100
--	-----------	-----

Note: Does not agree with the federal reportable quantity requirements to report

Florida Toxic Substances List:

<u>Chemical Name</u>	<u>CAS Number</u>
Diphenylmethane diisocyanate	101-68-8
Methylene bisphenyl isocyanate	101-68-8

Massachusetts Hazardous Substance List

<u>Chemical Name</u>	<u>CAS Number</u>	<u>Code</u>
Methylene bisphenyl isocyanate	101-68-8	2, 4, F8, F9

Minnesota Hazardous Substance List

<u>Chemical Name</u>	<u>CAS Number</u>	<u>Codes</u>	<u>Hazards</u>	<u>Carcinogen</u>
Diphenylmethane diisocyanate	101-68-8	ANO	--	False
Methylene bisphenyl isocyanate	101-68-8	ANO	--	False
1,1,1,2-Tetrafluoroethane	811-97-2	I	--	False

New York List of Hazardous Substances

<u>Chemical Name</u>	<u>CAS Number</u>	<u>RQ Air</u>	<u>RQ Land</u>	<u>Note</u>
Methylene bisphenyl isocyanate	101-68-8	1	1	--

Pennsylvania Hazardous Substances List

<u>Chemical Name</u>	<u>CAS Number</u>	<u>Code</u>
1,1'-methylenebis[4-isocyanato] benzene	101-68-8	Environmental Hazard

Washington Permissible Exposure Limits for Air Contaminants

Methylene bisphenyl isocyanate		
Ceiling	0.02 ppm	0.2 mg/m ³

Section 16 - Other Information

Prepared By: Research & Development

Revision Notes: Added VOC content to Section 9.

Additional Hazard Rating Systems:

Disclaimer: The information contained in this document is based upon data that was supplied to Carlisle by other companies and organizations. No warranty of merchantability or fitness for a particular purpose is expressed or implied regarding the accuracy or completeness of the data and/or information in this material safety data sheet.