MATERIAL SAFETY DATA SHEET
Product Name: MD-C-200® (Component ‘A’, Isocyanate)

Section 1: Chemical, Product and Company Information

Product Name: MD-C-200® Component ‘A’ (Isocyanate)

MD-C-200® is a registered trademark of Icynene Inc.

Product Use: SPRAY-ON AND POUR-IN COMPONENT "A" POLYMERIC MDI. A component of The Icynene Insulation System® (Spray Foam Insulation)

Product Code: MD-C-200 COMPONENT "A"

Revision Date: January 17, 2013

Section 2: Composition and Ingredient Information

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphenylmethane 4,4'-diisocyanate</td>
<td>101-68-8</td>
<td>30-60</td>
</tr>
<tr>
<td>Diphenylmethanediisocyanate, isomers and homologues</td>
<td>9016-87-9</td>
<td>30-60</td>
</tr>
</tbody>
</table>

Note: See Section 8 for exposure limits.

Section 3: Hazards Identification

This material is classified as hazardous under OSHA Hazard Communication Standard (29 CFR 1910.1200)

Emergency Overview:

DANGER!

CAUSES EYE AND SKIN BURNS. CAUSES RESPIRATORY TRACT IRRITATION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE BIRTH DEFECTS.

Corrosive to eyes and skin. Causes burns. May be harmful if absorbed through skin or if swallowed. Irritating to respiratory system. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Contains material that may cause target organ damage, based on animal data. Contains material which can cause birth defects. Avoid exposure during pregnancy. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

GENERAL INFORMATION:

Read the entire MSDS for a more thorough evaluation of the hazards.
Section 4: First Aid Measures

Eye Contact: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Skin Contact: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Inhalation: Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Ingestion: Obtain immediate medical attention. Get medical attention immediately. Wash out mouth with water. Move exposed person to fresh air. Do not induce vomiting unless directed to do so by medical personnel. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. Adrenalin and similar sympathomimetic drugs should be avoided following exposure as cardiac arrhythmia may result with possible subsequent cardiac arrest. Symptomatic treatment and supportive therapy as indicated. Following severe exposure the patient should be kept under medical review for at least 48 hours as delayed pulmonary oedema may develop. Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

Notes to Physician: Symptomatic and supportive therapy as needed. Following severe exposure, medical follow-up should be monitored for at least 48 hours.

Section 5: Fire Fighting Measures

FLAMMABLE PROPERTIES

Auto-ignition Temperature: NA

Flash Points: Closed cup: >110°C (230°F).

Flammable Limits: Not available

Explosion Hazard: Not sensitive to static or mechanical impact. Other conditions that may cause explosions are not available.

Fire Fighting Media and Instructions: Use an extinguishing agent suitable for the surrounding fire. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
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Protective Equipment for Fire Fighters:
Wear positive-pressure Self-Contained Breathing Apparatus, “SCBA” and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant clothing with SCBA. This will not provide sufficient fire protection; consider fighting fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

Products of Combustion:
Carbon Monoxide, Carbon Dioxide, Nitrogen Oxides of the form NOx and HCN, phosphorus oxides, halogenated compounds.

Protective Clothing (Fire):
Splash goggles. Full suit. Boots. Gloves. Self-Contained Breathing Apparatus, “SCBA”, should be used to avoid inhalation of the product.

Special Remarks on Fire Hazards:
Reacts slowly with water to produce carbon dioxide which may rupture closed containers. This reaction accelerates at higher temperatures.

Section 6: Accidental Release Measures

SEE MATERIAL SAFETY DATA SHEET Section 8. Exposure controls, personal protection

Small Spill and Leak:
No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

Large Spill and Leak:
Immediately contact emergency personnel. Evacuate the area. Keep upwind to avoid inhalation of vapours. Clean-up should only be performed by trained personnel. People dealing with major spillages should wear full protective clothing including respiratory protection. Use suitable protective equipment.

Contain and absorb large spillages onto an inert, non-flammable adsorbent carrier (such as earth or sand). Shovel into open-top drums or plastic bags for further decontamination, if necessary. Wash the spillage area clean with liquid decontaminant. Test atmosphere for MDI. Neutralize small spillages with decontaminant. Remove and properly dispose of residues.

Environmental Precautions:
Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). The CERCLA RQ for 4,4-MDI is 5,000 lbs.

Decontaminant Solution:
Preparation of Decontamination Solution: Prepare a decontamination solution of 0.2 – 0.5% liquid detergent and 3-8% concentrated ammonium hydroxide in water (5-10% sodium bicarbonate may be substituted for the ammonium hydroxide). Follow the precautions on the supplier’s material safety data sheets when preparing and using solution. Use of Decontamination Solution: Allow deactivated material to stand for at least 30 minutes before shoveling into drums. Do not tighten the bungs. Mixing with wet earth is also effective, but slower.
Section 7: Handling and Storage

**Handling:**
Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

**Storage:**
Keep container in a cool, well-ventilated area. Keep container tightly closed. Keep away from moisture. Due to reaction with water producing CO2-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. Do not reseal contaminated containers. Uncontaminated containers, free of moisture, may be resealed only after placing under a nitrogen blanket. Do not store in containers made of copper, copper alloys or galvanized surfaces.

Section 8: Exposure Controls and Personal Protection

<table>
<thead>
<tr>
<th>Ingredient:</th>
<th>ACGIH TLV (8-hr. TWA) ppm</th>
<th>U.S. OSHA PEL (8 hr. TWA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methylene bisphenyl isocyanate (MDI):</td>
<td>0.005 ppm TWA</td>
<td>0.02 ppm Ceiling</td>
</tr>
</tbody>
</table>

PEL’s are in accord with those recommended by OSHA.

**Preventive Measures:**
Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace. Medical supervision of all employees who handle or come in contact with respiratory sensitizers is recommended. Persons with respiratory problems including asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or skin allergies should be evaluated for their suitability of working with this product. Once a person is diagnosed as sensitized, no further exposure to the material that caused the sensitization should be permitted.

**Engineering Controls:**
Use local exhaust ventilation to maintain airborne concentrations below the TLV. Suitable respiratory equipment should be used in cases of insufficient ventilation or where operational procedures demand it. For guidance on engineering control measures refer to publications such as the ACGIH current edition of 'Industrial Ventilation, a manual of Recommended Practice.'

**Personal Protection:**

**Eyes:** Chemical Safety goggles. If there is a potential for splashing, use a full face shield.

**Body and Hands:** The following protective materials are recommended: Gloves (neoprene, nitril rubber or butyl rubber). Thin latex disposable gloves
should be avoided for repeated or long term use. Protective clothing should be selected and used in accordance with “Guidelines for the Selection of Chemical Protective Clothing” published by ACGIH.

**Respiratory:** When the product is sprayed or heated without adequate ventilation, an approved MSHA/NIOSH positive-pressure, supplied air respirator may be required. Air purifying respirators equipped with organic vapour cartridges and a HEPA (P100) particulate filter may be used under certain conditions when a cartridge change-out schedule has been developed in accordance with the OSHA respiratory protection standard (29 C.F.R. 1910.134).

Consult your supervisor or S.O.P, for special handling instructions.

**Splash goggles. Full suit. Vapour respirator or self-contained breathing apparatus (SCBA). Boots. Gloves. Suggested protective clothing might not be adequate. Consult a specialist before handling this product.**

**Section 9: Physical and Chemical Properties**

<table>
<thead>
<tr>
<th>Appearance/Physical State:</th>
<th>Liquid</th>
<th>Vapour Pressure: 0.000004 mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odour:</td>
<td>Slightly musty</td>
<td>Vapour Density: 8.5</td>
</tr>
<tr>
<td>Colour:</td>
<td>Brown</td>
<td>pH: Not applicable</td>
</tr>
<tr>
<td>Evaporation Rate:</td>
<td>Not available</td>
<td>Specific Gravity: 1.23 (Water = 1)</td>
</tr>
<tr>
<td>Boiling Point/Condensation Point:</td>
<td>&gt;300°C decomposes</td>
<td></td>
</tr>
<tr>
<td>Melting/Freezing Point:</td>
<td>15°C</td>
<td></td>
</tr>
<tr>
<td>Coefficient of Water/Oil Distribution</td>
<td>Not available</td>
<td></td>
</tr>
</tbody>
</table>

**Section 10: Stability and Reactivity**

**Stability and Reactivity:** Stable at room temperature.

**Conditions of Instability:** Avoid high temperatures. Avoid freezing.

**Incompatibility with Various Substances:** This product will react with any materials containing active hydrogens such as water, alcohol, amines, bases and acids. The reaction with water is very slow under 50°C (122°F) but is accelerated at higher temperatures. Some reactions may be violent.

**Hazardous Decomposition Products:** Reaction with water (moisture) produces CO2-gas. Exothermic reaction with materials containing active hydrogen groups. The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of the reaction partners is good or is supported by stirring or by the presence of solvents. MDI is insoluble with, and heavier than water and sinks to the bottom but reacts slowly at the interface. A solid water-insoluble layer of polyurea is formed at the interface by liberating carbon dioxide gas.
Avoid high temperatures.
water, alcohols, amines, bases, and acids

Combustion products may include: carbon oxides (CO, CO$_2$) nitrogen oxides (NO, NO$_2$ etc.) hydrocarbons and HCN

**Hazardous Polymerization:** Polymerization may occur at elevated temperatures in the presence of alkalis, tertiary amines and metal compounds.

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**Section 11: Toxicological Information**

**Toxicity to Animals:**
LD50 Rat Oral: >5000 mg/kg
LD50 Rabbit Dermal: >5000 mg/kg
LC50 Rat Inhalation: 0.49 mg/L

**Inhalation:** Toxic by inhalation. May cause sensitization by inhalation

**Skin Contact:** Irritating to skin. May cause sensitisation by skin contact

**Eye Contact:** Irritating to eyes.

**Ingestion:** Low oral toxicity. Ingestion may cause irritation of the gastrointestinal tract

**Carcinogenic Effects:** Rats have been exposed for two years to a respirable aerosol of polymeric MDI which resulted in chronic pulmonary irritation at high concentrations. Only at the top level (6 mg/m$^3$), there was a significant incidence of a benign tumour of the lung (adenoma) and one malignant tumour (Aden carcinoma). There were no lung tumours at 1 mg/m$^3$ and no effects at 0.2 mg/m$^3$. Overall, the tumour incidence, both benign and malignant, and the number of animals with the tumours were not different from controls. The increased incidence of lung tumours is associated with prolonged respiratory irritation and the 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 tumour formation will occur.

**Mutagenic Effects:** There is no substantial evidence of mutagenic potential

**Reproductive Effects:** No known significant effects or critical hazards.

**Teratogenic Effects:** No birth defects were seen in two independent animal (rat) studies. Fetotoxicity was observed at doses that were extremely toxic (including lethal) to the mother. Fetotoxicity was not observed at doses that were not maternally toxic. The doses used in these studies were maximal, respirable concentrations, which are well in excess of defined occupational exposure limits.

**Target Organs:** Contains material which causes damage to the following organs: lungs, upper respiratory tract, skin.

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**Section 12: Ecological Information/Environmental Fate**

**Ecotoxicity:** Diphenylmethane 4,4’- diisocyanate. EC50 (Daphnia Magna) (48 hour) >1000 mg/L. Acute LC50 Fish: 96 hours >1000 mg/L
Environmental Fate and Distribution:
By considering the production and use of the substance, it is unlikely that significant environmental exposure in the air or water will arise. Immiscible with water, but will react with water to produce inert and non-biodegradable solids. Conversion to soluble products, including diamino- diphenylmethane (MDA), is very low under the optimal laboratory conditions of good dispersion and low concentration. In air, the predominant degradation process is predicted to be a relatively rapid OH radical attack, by calculation and by analogy with related diisocyanates.

Degradation & Persistence:
Comparison with an analogous product, the following values are anticipated. The measured ecotoxicity is that of the hydrolised product, generally under conditions maximizing production of soluble species. Even so, the observed ecotoxicity is low/very low. A pond study showed gross contamination caused no significant toxic effects on a wide variety of flora in all tropic levels (including fish), no detectable diaminodiphenyl methane (MDA), and no evidence of bioaccumulation of MDI or MDA.

Section 13: Disposal Considerations
See Section 15 for Regulatory Information.

Waste Information:
The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14: Transport Information

DOT Classification:
Single containers less than 5,000 lbs. are not regulated. Single containers with 5,000 lbs. or more of 4,4’-Methylene Diphenyl Diisocyanate are regulated as: Other Regulated Substances, Liquid, N.O.S. (Methylene Diphenyl Diisocyanate), 9, NA3082, PGIII, RQ.

Canadian Transportation of Dangerous Goods (TDG) Classification:
Not regulated.

IMO/IMDG Classification:
Not regulated.

ICAO/IATA Classification:
Not regulated.

Section 15: Regulatory Information

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, expressed or implied is given. Regulatory requirements are
subject to change and may differ from one location to another; it is the buyer’s responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

REGULATORY INFORMATION (Not meant to be all-inclusive-selected regulations represented).
This material is classified as hazardous under OSHA Hazard Communication Standard (29 CFR 1910.1200).

US FEDERAL REGULATIONS
This material is classified as hazardous under OSHA Hazard Communication Standard (29 CFR 1910.1200).

HCS Classification:
Toxic
Irritating Material
Sensitizing material
TSCA 8(b) inventory: All Ingredients Listed.
TSCA 12(b) one-time export notification:

SARA Title III Section 313 (40 CFR Part 372):
EPCRA Section 313 (40 CFR 372) Diisocyanate Compounds (Category Code N120) 98%
EPCRA Section 313 (40 CFR 372) CERCLA (Comprehensive Environmental Response, Compensation and Liability Act): 4,4-Methylene diphenyl Diisocyanate (CAS 101-68-8) has a 5,000 lb. RQ (reportable quantity). Any spill or release above the RQ must be reported to the National Response Center (800-424-8802)
This product does not contain nor is it manufactured with ozone depleting substances.

State Regulations:
California Prop. 65: No ingredients listed.

CANADIAN REGULATIONS
This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (material Safety Data Sheet) contains all the information required by the CPR.

WHMIS Canada:
Class D-1A – Material causing immediate and serious toxic effects (very toxic).
Class D-2A – Material causing other toxic effects (Very toxic).
Class D-2B – Material causing other toxic effects (Toxic).

CEPA:
DSL/NDSL: All Ingredients Listed.

Section 16:
Other Information

CAUSES DAMAGE TO THE FOLLOWING ORGANS: LUNGS, RESPIRATORY TRACT, SKIN, EYES. MAY BE HARMFUL IF INHALED. MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC RESPIRATORY AND SKIN REACTION.
HAZARDOUS MATERIAL INFORMATION SYSTEM (U.S.A.):  
Health 2  
Fire Hazard 1  
Reactivity 1  

NATIONAL FIRE PROTECTION ASSOCIATION (U.S.A.):  
Fire Hazard 2  
Health 2  
Reactivity 1  

Manufacturer Disclaimer:  
While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.  

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.  

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION, WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.  

Hazards, toxicity, and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.  

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED ICYNENE EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE, DATA SHEETS FOR ICYNENE PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM ICYNENE. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO ICYNENE, MANUFACTURING MANAGER, PRODUCT SAFETY, AT THE ABOVE-NOTED ADDRESS.  

Revision Date: January 17, 2013  
Prepared By: Stephanie Holborne, R&D Chemist  
Telephone: 1.800.758.7325
HEALTH AND SAFETY STATEMENT FOR CERTIFIED IcYNENE SPRayers

Icynene products have an excellent health and safety record spanning more than 350,000 insulation projects over more than 25 years. Nonetheless, safe handling practices during and immediately following installation are required to eliminate the possibility of health effects from exposure to isocyanates. Asthma, other lung problems, and irritation of the nose and throat can result from inhalation of isocyanates. Direct contact with the skin and eyes can result in irritation. Different individuals will react differently to the same exposures; some will be more sensitive than others. Severe asthma attacks have been reported in some sensitized workers exposed repeatedly to isocyanates while not wearing proper protective equipment. Some reports indicate a reaction and sensitization can occur following a single, sustained occupational exposure to isocyanates without proper protective equipment above the OSHA permissible exposure limit. But sensitization might not occur immediately in some individuals. Consistent use of personal proper protective equipment to prevent exposure during spraying and within the 24 hour-period after spraying is completed is critical to eliminating the health hazard. Once sensitization has occurred, a worker might not be able work safely with spray foam insulation again.

Sprayers, sprayer helpers, and anyone else present during spraying or within 24 hours after spraying is complete: You must wear proper Personal Protective Equipment (PPE) at all times during spray, including full-body-coverage, chemical-protective clothing and a NIOSH-certified respirator with fresh air supply. While spraying and for 24 hours after spraying is completed, no one must be allowed within 50 feet of the sprayed foam without wearing this type of PPE at all times. Adequate active, negative pressure ventilation (exhaust fans) of the job site must be in place during spray and for 24 hours after spray is complete.

Independent studies indicate that with 24 hours’ active ventilation after spraying is completed, Icynene spray foam insulation is safely cured.