

# Material Safety Data Sheet



P. O. Box 1528 • MOUNT AIRY, NC 27030-1528  
336-789-9161 • FAX 336-789-9586 • www.NCFI.com

Dalton, GA

Hickory, NC

Mount Airy, NC

Salt Lake City, UT

## PRODUCT IDENTIFICATION

**Trade Name:** NCFI 21-041 R      **Chemical Family:** Polyol Resin System  
**Chemical Name:** Mixture      **Formula:** N/A  
**Synonyms:** Polyurethane Resin      **Date Prepared:** 07/29/13

## INGREDIENTS-HAZARD CLASSIFICATION

Name:	CAS NO.	%	PEL
1,1,1,3,3-Penta Fluoropropane <sup>1</sup> (CF <sub>3</sub> CH <sub>2</sub> CHF <sub>2</sub> or HFC-245fa)	460-73-1	< 8	None Established. 300 ppm TWA recommended.
Tertiary Amine Catalysts <sup>1</sup>		< 1	None Established.
Trans-1,2-Dichloroethylene <sup>1</sup>	156-60-5	< 3	200 ppm TWA

<sup>1</sup> Not listed as a carcinogen (NTA, IARC, OSHA)

## SHIPPING INFORMATION

Not regulated when shipped domestically by land, water or air.

## PHYSICAL DATA

**Boiling Point (°F):** CF<sub>3</sub>CH<sub>2</sub>CHF<sub>2</sub>, 60°F      **Specific Gravity:** 1.157  
**Solubility in Water:** Slight      **% Volatile by Volume:** 10  
**Appearance and Odor:** Amber liquid, ethereal odor

## FIRE AND EXPLOSION HAZARD DATA

**Flash Point (test method):** After CF<sub>3</sub>CH<sub>2</sub>CHF<sub>2</sub> evaporation, >200°F (P-M)      **Flammable Limits (vapor)**  
**Extinguishing Media:** Water, dry chemicals, CO<sub>2</sub>      Lower: None; Upper: None  
**Special Fire Fighting Procedures:** A self-contained breathing apparatus should be worn to protect against toxic and irritating vapors.  
**Unusual Fire and Explosion Hazards:** Overheated containers may rupture due to pressure produced by CF<sub>3</sub>CH<sub>2</sub>CHF<sub>2</sub>. CF<sub>3</sub>CH<sub>2</sub>CHF<sub>2</sub> burns to form acids and noxious gases.

## REACTIVITY DATA

**Stability:** Stable      **Conditions to Avoid:** Temperatures over 85°F  
**Polymerization:** Will not occur      **Conditions to Avoid:** N/A  
**Incompatibility:** Isocyanates and other chemicals that react with hydroxyl groups.  
**Hazardous Decomposition Products:** When burned; CO, CO<sub>2</sub>, NO<sub>x</sub>, aliphatic fragments, halogens, halogen acids and possibly carbonyl halides.

## HEALTH HAZARD DATA

**Permissible Exposure Limit:** None established.

**Effects of Overexposure:** May cause skin or eye irritation upon contact. Avoid breathing vapors. The dense vapors can displace and reduce breathing air in confined or unventilated spaces causing asphyxiation. Overexposure may cause tremors, confusion, irritation, and may result in cardiac sensitization.

## First Aid Procedures

**Eyes:** Flush with water for at least 15 minutes. See a physician if irritation develops.

**Skin:** Wash with soap and water at first opportunity.

**Inhalation:** Move to fresh air if symptoms develop. If breathing is difficult, give oxygen and call physician.

**Ingestion:** Do not induce vomiting unless instructed to do so by a medical professional.

## SPECIAL PROTECTION INFORMATION

**Ventilation:** Local exhaust ventilation is recommended when working with this product. Uses requiring heating and/or spraying may require more ventilation or personal protective equipment.

**Respiratory Protection:** The specific respirator selected must be based on contamination levels of this material found in the workplace and the working limits of the respirator. A supplied air, full-face mask, positive pressure or continuous flow respirator or a supplied air hood is required when airborne concentrations are unknown or exceed threshold limit values. A positive pressure, self contained breathing apparatus can be used in emergencies or other unusual situations. Full-face air purifying respirators equipped with organic vapor cartridges can be used in certain situations, *see OSHA standard 29CFR 1910.134*. All equipment must be NIOSH approved and maintained.

**Eye Protection:** Goggles or chemical safety glasses.

**Gloves:** Chemically resistant rubber or plastic.

**Other:** Avoid eye and skin contact. Eye wash system and showers should be available.

## SPILL OR LEAK PROCEDURES

Remove or extinguish ignition or combustion sources.

Contain spill. Absorb with sawdust, etc., and shovel into container. Waste material should be disposed of under conditions which meet federal, state, and local environmental regulations.

Wash area with detergent and water.

## SPECIAL PRECAUTIONS

Store between 65°F and 85°F out of sunlight. Keep tightly sealed. Relieve pressure slowly when opening container.

R Component drums can be sent to drum reconditioners or disposed of as ordinary industrial waste in compliance with pertinent regulations.

**CAUTION:** Under no circumstances should empty drums be burned or cut open with an electric or gas torch.

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## PRODUCT IDENTIFICATION

**Trade Name:** NCFI 21-041 A

**Chemical Family:** Aromatic Isocyanate

**Chemical Name:** Polymethylene polyphenylisocyanate

**Formula:** N/A

**Synonyms:** Polymeric MDI

**Date Prepared:** 07/29/13

## INGREDIENTS-HAZARD CLASSIFICATION

Name:	CAS NO.	%	PEL
Diphenylmethane diisocyanate (MDI) <sup>1</sup>	101-68-8	50	0.02 ppm ceiling
Higher polymers of similar structure	9016-87-9	50	None Established.

<sup>1</sup> Not listed as a carcinogen (NTA, IARC, OSHA)

## SHIPPING INFORMATION

Not regulated when shipped by land, water or air when packaged in single containers of 5000 pounds or less.

## PHYSICAL DATA

**Boiling Point (°F):** 625°F

**Specific Gravity:** 1.24

**Solubility in Water:** Insoluble, reacts

**% Volatile by Volume:** None

**Appearance and Odor:** Brown liquid, slight aromatic odor

## FIRE AND EXPLOSION HAZARD DATA

**Flash Point (test method):** 390°F (P-M)

**Extinguishing Media:** Water, dry chemicals, CO<sub>2</sub>

**Special Fire Fighting Procedures:** A self-contained breathing apparatus should be worn to protect against toxic and irritating vapors.

**Unusual Fire and Explosion Hazards:** At temperatures above 400°F, MDI can polymerize/decompose causing pressure build-up in closed containers and possibly rupture. Avoid water contamination in closed containers which may cause rupture (CO<sub>2</sub> is evolved).

## REACTIVITY DATA

**Stability:** Stable

**Conditions to Avoid:** Contamination with water

**Polymerization:** May occur from contact with water, alcohols, glycols or other materials containing active hydrogens.

**Incompatibility:** Water, alcohols, amines, strong bases.

**Hazardous Decomposition Products:** By high heat or fire; CO, CO<sub>2</sub>, NO<sub>x</sub>, benzene, toluene, aliphatic fragments and traces of HCN

## HEALTH HAZARD DATA

**Permissible Exposure Limit:** 0.02 ppm ceiling for MDI.

**Effects of Overexposure:** May cause skin or eye irritation upon contact. Inhalation of MDI vapors may cause breathlessness, chest discomfort, coughing and reduced pulmonary functions. Exposure may produce asthma-like symptoms, also may lead to allergic sensitivity.

### First Aid Procedures:

**Eyes:** Flush with flowing water for at least 15 minutes, then obtain medical attention.

**Skin:** Remove contaminated clothing and wash off with soap & water.

**Inhalation:** Remove to fresh air, administer oxygen if necessary.

**Ingestion:** Drink large amounts of water. See a physician.

## SPECIAL PROTECTION INFORMATION

**Ventilation:** MDI has a very low vapor pressure at room temperature. General/local ventilation typically control exposure levels very adequately. Uses requiring heating and/or spraying may require more aggressive engineering controls or personal protective equipment. Monitoring is required to determine engineering controls.

**Respiratory Protection:** The specific respirator selected must be based on contamination levels of this material found in the workplace and the working limits of the respirator. A supplied air, full-face mask, positive pressure or continuous flow respirator or a supplied air hood is required when airborne concentrations are unknown or exceed threshold limit values. A positive pressure, self contained breathing apparatus can be used in emergencies or other unusual situations. Full-face air purifying respirators equipped with organic vapor cartridges can be used in certain situations, *see OSHA standard 29CFR 1910.134*. All equipment must be NIOSH approved and maintained.

**Eye Protection:** Wear goggles or chemical safety glasses.

**Gloves:** Chemically resistant rubber or plastic.

**Other:** Avoid eye and skin contact. Eye wash system and safety showers should be available.

## SPILL OR LEAK PROCEDURES

Contain spill. Absorb with sawdust, etc., and shovel into open top drum. Decontaminate absorbent and spill area with 2% detergent/water solution. Let waste stand for 1 to 2 days, then dispose of waste in a licensed facility. Respiratory protection/ventilation is recommended during clean-up.

## SPECIAL PRECAUTIONS

Store between 65°F and 85°F out of sunlight. Keep tightly sealed to prevent moisture contamination. Relieve pressure slowly when opening container. Once opened, protect contents from water with dry atmosphere (-40°F dew point). If isocyanate becomes contaminated, do not reseal. Empty isocyanate drums or other container should be decontaminated by filling with water or decontamination solution, preferably outdoors. Allow to stand for 24-48 hours, open to the atmosphere. **DO NOT SEAL DRUMS OR CONTAINERS.** Drain the drums and puncture to prevent reuse. Dispose of as ordinary industrial waste.

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Date Prepared: 2/22/89  
Last Revision Date: 4/09/13

## SARA 313 INFORMATION

The isocyanate (A) component product of this NCFI system contains the following chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986, EPCRA Section 313 (40 CFR 372) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>	<u>CERCLA RQ</u>	<u>CONCENTRATION</u>
Methylene Bis Phenylisocyanate Component (Same as Diphenylmethane diisocyanate (MDI))	101-68-8	5000 lbs.	See MSDS – A
Polymeric Diphenylmethane diisocyanate Component	9016-87-9		See MSDS – A

### IMPORTANT NOTICE

This notification is a part of the Material Safety Data Sheet document and must not be detached. Any copying and redistribution of the Material Safety Data Sheet shall include copying of this notice and attaching the copy to the redistributed Material Safety Data Sheet copies.



**NCFI Polyurethanes**  
 Div. of Barnhardt Manufacturing Co.  
 PO Box 1528 • Mount Airy, NC 27030  
 800-346-8229 [www.NCFI.com](http://www.NCFI.com)

## Technical Data Sheet

### NCFI LOW DENSITY POUR SYSTEM 21-041

#### DESCRIPTION:

NCFI 21-041 is a two component, HFC-245fa blown, all PMDI based, nominal 1.8 pcf density, pour-in-place urethane foam system. It is designed for void filling applications which require a high degree of flow. NCFI 21-041 component viscosities make the system suitable for either mechanical mix machines or impingement high pressure (over 600 psi) mixing machines. NCFI 21-041 meets the requirements of Mil Spec MIL-PRF-26514G.

#### DISTINGUISHING CHARACTERISTICS:

- Slow Reactivity
- Excellent Flow
- Low Component Viscosity
- Wide Processing Parameter Window
- Meets MIL-PRF-26514G

#### TYPICAL RESIN PROPERTIES:

	<u>21-041 R</u>	<u>21-041 A</u>
Viscosity @ 72°F	575 cps	200 cps
Lbs./Gallon	9.6 lbs.	10.2 lbs.
Appearance	transparent, amber liquid	transparent, brown liquid
Shelf Life	6 months	6 months

#### MIX RATIO:

	<u>21-041 R</u>	<u>21-041 A</u>
By Weight	100 parts	103 parts
By Volume	100 parts	96 parts

#### TYPICAL REACTION PROPERTIES:

Hand Mix 203 grams @ 72°F, 1500 rpms

Cream Time	16 seconds
Gel Time	88 seconds
Tack Free Time	138 seconds
Rise Time	172 seconds
Density (FRC)	1.8 pcf

#### TYPICAL PHYSICAL PROPERTIES:

Molded Density, ASTM D 1622	2.6 pcf
Free-rise Density,	1.8 pcf
Compressive Strength, ASTM D 1621	34 psi
Parallel-to-rise	23 psi
After hydrolytic stability test	21 psi
Perpendicular-to-rise	14 psi
After hydrolytic stability test	12 psi
k - factor, initial, ASTM C 518	0.15
Moisture Vapor Transmission, ASTM E 96	2-4 perm in.
Closed Cell Content	>94%
Dimensional Stability, ASTM D 2126	
200°F 28 days	+ 1.4%
158°F, 100% R.H. 28 days	- 0.9%
-20°F 28 days	- 0.3%
Relative Combustibility, MIL-PRF-26514G	pass
Water Absorption, ASTM D 2842	≤0.06 lbs/sq ft
Resistance to Mold and Mildew	Excellent
Maximum Service Temperature	200°F

\*The above values are average values obtained from laboratory experiments and should serve only as guide lines.

## NCFI 21-041 APPLICATION INFORMATION

### EQUIPMENT AND COMPONENT RATIOS:

NCFI 21-041 should be mixed by pour machines designed to mix urethane chemicals. It is recommended that this system be processed with either HPIM machines or low pressure equipment with mechanical mix heads, both with the capability of controlling component temperatures to 60°F - 80°F. NCFI 21-041 **R** is connected to the **resin/polyol** pumps with NCFI 21-041 **A** being connected to the **isocyanate** pumps.

### MOLDING RECOMMENDATION:

To obtain optimum yield, consistent part quality and quick demold times, the mold temperature must be 80°F or higher. Recommended temperature is 100°F. Heating molds with radiant or convection heat sources should be accomplished without producing 'hot spots'. Molds may be constructed of fiberglass, aluminum, epoxy or other thermal conductive material. Mold surfaces must be coated with a suitable release agent and dried before molding. Follow the recommendations of the mold release supplier. The mold design should offer adequate clamping pressure and allow trapped air to escape through vent holes in the top or the parting lines of the mold.

### STORAGE AND USE OF CHEMICALS:

Keep temperature of chemicals at 70°F for several days before use. Cold chemicals can cause poor mixing, pump cavitation or other process problems due to higher viscosity at lower temperatures. Storage temperature should not exceed 100°F. Prolonged exposure to temperatures below 60°F can cause the 'A' component to freeze. Do not store in direct sunlight. Keep drums tightly closed when not in use and under nitrogen pressure of 2 - 3 psi after they have been opened.

### SAFE HANDLING OF LIQUID COMPONENTS:

Use caution in removing bungs from the container. Loosen the small bung first and let any built up gas escape before completely removing. Avoid prolonged breathing of vapors. In case of chemical contact with eyes, flush with water for at least 15 minutes and get medical attention. For further information refer to "MDI-Based Polyurethane Foam Systems: Guidelines for Safe Handling and Disposal" publication AX-119 published by the Center For The Polyurethanes Industry 1300 Wilson Blvd, Suite 800, Arlington, VA 22209.

### Caution:

Polyurethane products manufactured or produced from this liquid system may present a serious fire hazard if improperly used or allowed to remain exposed or unprotected. The character and magnitude of any such hazard will depend on a broad range of factors which are controlled and influenced by the manufacturing and production process, by the mode of application or installation and by the function and usage of the particular product. *Any flammability rating contained in this literature is not intended to reflect hazards presented by this or any other material under actual fire conditions. These ratings are used solely to measure and describe the product's response to heat and flame under controlled laboratory conditions.* Each person, firm or corporation engaged in the manufacture, production, application, installation or use of any polyurethane product should carefully determine whether there is a potential fire hazard associated with such product in a specific usage, and utilize all appropriate precautionary and safety measures

The information on our data sheets is to assist customers in determining whether our products are suitable for their applications. The customers must satisfy themselves as to the suitability for specific cases. NCFI Polyurethanes warrants only that the material shall meet its specifications; this warranty is in lieu of all other written or unwritten, expressed or implied warranties and NCFI Polyurethanes expressly disclaims any warranty of merchantability, fitness for a particular purpose, or freedom from patent infringement. Accordingly, buyer assumes all risks whatsoever as to the use of the material. Buyer's exclusive remedy as to any breach of warranty, negligence or other claim shall be limited to the purchase price of the material. Failure to adhere strictly to any recommended procedures shall relieve NCFI Polyurethanes of all liability with respect to the material or the use thereof.



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**\* APPLICATOR BULLETIN \***

**GENERAL GUIDELINES FOR NEW AND RETROFIT  
APPLICATIONS OF SPRAY POLYURETHANE FOAM**

We recommend the following steps to ensure a safer worksite when polyurethane foam is applied:

1. Persons handling foam system chemicals, or involved in the foam application, should always first read and understand the required Material Safety Data Sheet and Physical Property Bulletin for the system being applied.
2. Any debris, trash, etc. should be removed from the area being sprayed before application begins.
3. Schedule job so that any hot work including soldering, welding, etc. is completed before foam application. Post signs that "no hot work should be done within the vicinity of finished foam" and ensure these signs will be left in place permanently.
4. Smoking or any other ignition source should not be permitted while foam is being applied.
5. No flammable chemicals, such as wasp and hornet killer, should be sprayed in the area of the foam application 24 hours before or after foam application, and only then if the area is well ventilated.
6. For areas not covered with a walking surface, install temporary planking on the attic floors to provide attic traffic paths and working platforms. Cover exposed recessed lighting fixtures, wiring and other fixtures with masking to protect from overspray and damage. Do not apply foam directly to any recessed lighting fixtures.
7. A qualified electrician should conduct a complete electrical inspection in retrofit applications (especially when a fuse box is present instead of a breaker panel) to be sure application is safe and risk of electrical fire is avoided due to substandard, damaged, and/or improper electrical system.



8. At least one approved fire extinguisher should be present in the immediate area of the applicators while preparation and application occurs. One should also be located in the trailer or truck where the foam equipment and chemical is stored.
9. Spraying foam will generate heat. Foam which is applied too thick in single passes can build temperatures which will degrade cell structure and not produce foam with optimum properties. Individual formulations will differ in how thick specific foam may be applied and how it will react if sprayed excessively thick. In the most extreme case, some systems could reach dangerously high temperatures inside the finished foam which could lead to splitting, charring, or even spontaneous combustion.
10. NCFI recommends that spray pass thickness not exceed a maximum of two inches for closed cell foams or twelve inches for open cell foams. If multiple passes are sprayed, ten minutes should be allowed for the exothermic heat to dissipate before each additional pass is applied. For specific recommendations, contact NCFI.
11. Foam should only be applied as specified to the building envelope enclosing the conditioned space.
12. Any substandard foam applied for any reason (due to operator error, improper chemical storage, equipment malfunction, etc.) should be completely removed immediately and disposed of properly.
13. All substrates being insulated with foam must be fully ventilated for at least 24 hours after application so all heat and vapors may fully dissipate.
14. Any foam shavings or trimmings should be removed from the site after application and disposed of properly.
15. Persons involved in the application process should be outfitted with proper Personal Protective Equipment (PPE). Refer to your Contractor Product Stewardship Manual for detailed recommendations.

For any questions or more information please contact NCFI toll free at 800-346-8229.