

# Designer Molecules, Inc.

## Material Safety Data Sheet

Product: FM51-27N  
MSDS ID: FM51-27N

Revised Date: 04/21/20  
Replaces Date: New

### 1. Product and Company Information

Product Code: FM51-27N  
Trade Name(s): R&D Sample  
Product Type: Maleimide Terminated Polyimide Resin Solution (>51 wt% resin in Toluene)  
Recommended Use: Thermoset resin  
Restrictions: None identified

Company: Designer Molecules, Inc.  
10080 Willow Creek Rd.  
San Diego, CA 92131  
Telephone: 858-348-1122

Emergency phone number (spill, leak, fire, exposure or accident):  
US Domestic (800) 535-5053 (INFOTRAC) Includes Canada and Mexico  
International +1 (352) 323-3500  
China Specific (86) 400-120-0761  
Germany Specific (49) 0800-181-2924  
Australia Specific (61) 1-300-366-961

### 2. Hazards Identification

#### Classification of the substance or mixture

##### GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225  
Skin irritation (Category 2), H315  
Reproductive toxicity (Category 2), H361  
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336  
Specific target organ toxicity - repeated exposure (Category 2), H373  
Aspiration hazard (Category 1), H304  
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

#### GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H225 Highly flammable liquid and vapour.  
H304 May be fatal if swallowed and enters airways.  
H315 Causes skin irritation.  
H336 May cause drowsiness or dizziness.  
H361 Suspected of damaging fertility or the unborn child.  
H373 May cause damage to organs through prolonged or repeated exposure.  
H401 Toxic to aquatic life.

# Designer Molecules, Inc.

## Material Safety Data Sheet

Product: FM51-27N  
MSDS ID: FM51-27N

Revised Date: 04/21/20  
Replaces Date: New

### Precautionary statement(s)

- P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
P233 Keep container tightly closed.  
P240 Ground/bond container and receiving equipment.  
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.  
P242 Use only non-sparking tools.  
P243 Take precautionary measures against static discharge.  
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.  
P264 Wash skin thoroughly after handling.  
P271 Use only outdoors or in a well-ventilated area.  
P273 Avoid release to the environment.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.  
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.  
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.  
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
P331 Do NOT induce vomiting.  
P332 + P313 If skin irritation occurs: Get medical advice/ attention.  
P362 Take off contaminated clothing and wash before reuse.  
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.  
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.  
P403 + P235 Store in a well-ventilated place. Keep cool.  
P405 Store locked up.  
P501 Dispose of contents/ container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC) or not covered by GHS - none

### 3. Composition/Information on Ingredients

**Synonyms:** FM51-27N  
Imide extended bismaleimide oligomer

COMPONENT	CAS#	CONCENTRATION	LC <sub>50</sub> /LD <sub>50</sub>
Amines, C36-alkylenedi-, polymers with bicyclo[2.2.1]heptandimethanamine, [5,5'-biisobenzofuran]-1,1',3,3'-tetrone and 3a,4,5,7a-tetrahydro-7-methyl-5-(tetrahydro-2,5-dioxo-furanyl)-1,3-isobenzofurandione, maleated	2414426-71-2	60 - 65 %	Not Established
Toluene	108-88-2	35 - 45 %	See § 11

### 4. First Aid Measures

- SWALLOWING:** Do not induce vomiting. Give person large amounts of water. Get immediate medical attention.
- SKIN CONTACT:** Wash area with soap and water. Remove contaminated clothing and shoes. Wash or clean before reuse.
- INHALATION:** Remove person to fresh air. If breathing has stopped, perform artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

# Designer Molecules, Inc.

## Material Safety Data Sheet

Product: FM51-27N  
MSDS ID: FM51-27N

Revised Date: 04/21/20  
Replaces Date: New

**EYE CONTACT:** Flush with water for 15 minutes. Get immediate medical attention.

**NOTES TO PHYSICIAN:**

There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

## 5. Fire and Explosion Hazard Data

**FLAMMABLE LIQUID**

**FLASH POINT (method):** 7°C (45°F), estimated – closed cup (solvent)

**EXTINGUISHER METHOD:** CO<sub>2</sub>, foam, dry chemical

**UPPER FLAMMABLE LIMIT:** Not available

**LOWER FLAMMABLE LIMIT:** Not available

**AUTO-IGNITION TEMPERATURE:** Not available

**HAZARDOUS COMBUSTION PRODUCTS:** Oxides of carbon and nitrogen

**EXPLOSION DATA:** Not available

**SPECIAL FIRE-FIGHTING PROCEDURES:**

Fire fighters should wear NIOSH/MSHA approved pressure demand self-contained breathing apparatus. Decontaminate or discard any clothing that may contain chemical residues.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:**

Do not enter fire area without proper protection. See Section 10, Reactivity Data, for decomposition products possible. Fight fire from safe distance and protected location. Heat/impurities may increase temperature/build pressure/rupture closed containers, spreading fire, increasing risk of burns/injuries. Water may be ineffective in firefighting due to low solubility. Use water spray/fog for cooling. Pressure relief system may plug with solids, increasing risk of overpressure.

## 6. Accidental Release Measures

**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:**

Promptly absorb spill. Remove sources of ignition. Cover drains to prevent entry into waterways. Wear personal protective equipment (clothing and gloves) when handling spilled materials. Avoid breathing vapors.

**PERSONAL PRECAUTIONS:**

Wear suitable protective equipment.

**ENVIRONMENTAL PRECAUTIONS:**

This product is essentially insoluble in water. This material is resistant to rapid biodegradation. May be toxic to aquatic life. Avoid runoff to waterways and sewers.

## 7. Handling and Storage

**HANDLING:** Avoid contact with eyes.

Keep container closed.

Use with adequate ventilation.

Wash thoroughly after handling.

**VENTILATION:** General (mechanical) room ventilation is expected to be satisfactory for use at room temperature. Special, local ventilation is recommended at points where vapors generated at high temperatures may be vented to the workplace air.

**STORAGE:** Store at room temperature away from direct light and incompatible materials identified in the *Stability and Reactivity Section*.

# Designer Molecules, Inc.

## Material Safety Data Sheet

Product: FM51-27N  
MSDS ID: FM51-27N

Revised Date: 04/21/20  
Replaces Date: New

### 8. Exposure Controls and Personal Protection Measures

#### CONTROL PARAMETERS:

##### Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Toluene	108-88-3	TWA	100 ppm 375 mg/m <sup>3</sup>	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		STEL	150 ppm 560 mg/m <sup>3</sup>	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
	Remarks	Z37.12-1967		
		CEIL	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.12-1967		
		Peak	500 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.12-1967		
		TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Visual impairment Female reproductive Pregnancy loss 2015 Adoption Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm 375 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits
		ST	150 ppm 560 mg/m <sup>3</sup>	USA. NIOSH Recommended Exposure Limits

##### Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Toluene	108-88-3	Toluene	0.0200 mg/l	In blood	ACGIH - Biological Exposure Indices
	Remarks	Prior to last shift of workweek			
		Toluene	0.0300 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
		o-Cresol	0.3000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

# Designer Molecules, Inc.

## Material Safety Data Sheet

Product: FM51-27N  
MSDS ID: FM51-27N

Revised Date: 04/21/20  
Replaces Date: New

### PERSONAL PROTECTION:

Respiratory: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use. If a respirator is used, a NIOSH/MSHA approved respirator with organic vapor/dust-mist fume filters represents the minimum level of respiratory protection.

Hands: Solvent impermeable gloves.

Eyes: Chemical safety goggles.

Skin: Chemical-resistant clothing.

### OTHER PROTECTIVE EQUIPMENT:

Wear protective clothing.

### ENGINEERING CONTROLS:

Ventilation:

Local Exhaust:

Fume hood at point of generation with sufficient exhaust to remove material from breathing zone.

## 9. Physical / Chemical Characteristics

### APPEARANCE:

Physical State:	Viscous Liquid
Color:	Amber / Light brown
Odor:	Toluene odor
Odor Threshold:	Not available

### OTHER PROPERTIES:

Specific Gravity (H <sub>2</sub> O=1):	0.95 @ 25° C
Vapor Pressure:	22 mmHg @ 20° C (Toluene)
Vapor Density (Air=1):	Heavier than air.
Evaporation rate (BuAc=1):	2 (solvent)
Boiling Point:	115° C (at std. temperature & pressure, unless noted below)
Freezing Point:	< 0° C (at std. temperature & pressure, unless noted below)
pH:	Not applicable
Coefficient of water/oil dist.	Not available
Solubility in water:	Insoluble
Percent volatile (weight):	< 49%

## 10. Stability and Reactivity

### STABILITY:

Stable

### CONDITIONS TO AVOID:

Elevated temperatures

### INCOMPATIBLE MATERIALS:

Incompatible with strong oxidizing, strong reducers.

### HAZARDOUS DECOMPOSITION PRODUCTS:

Acrid smoke-fumes/carbon monoxide/carbon dioxide and perhaps other toxic vapors may be released during a fire involving this product.

### HAZARDOUS POLYMERIZATION:

Will not occur during normal storage and handling.

# Designer Molecules, Inc.

## Material Safety Data Sheet

Product: FM51-27N  
MSDS ID: FM51-27N

Revised Date: 04/21/20  
Replaces Date: New

### 11. Toxicological Information

**ROUTE OF ENTRY:** Inhalation; Ingestion; Eye Contact; Skin Contact  
**CARCINOGEN:** There is no evidence that this product poses a carcinogenic risk under normal conditions of handling and use.

#### PRODUCT TOXICOLOGY

**PRODUCT INFORMATION:** Low acute toxicity under normal handling and use.

**ACUTE EFFECTS OF EXPOSURE:** May cause irritation to eyes and respiratory system. High exposure may cause anesthesia and irregular heartbeat due to the heart's increased sensitivity to adrenaline

**CHRONIC EFFECTS OF EXPOSURE:** The toxicological properties of this product have not been fully evaluated. Use of good industrial hygiene practices is required. Avoid direct contact with skin or eyes. Do not ingest or inhale.

**TARGET ORGANS:** Eyes, skin

**POSSIBLE BIRTH DEFECT HAZARD:** Yes

**SENSITIZATION TO PRODUCT:** Yes

**CARCINOGENICITY:** No

**REPRODUCTIVE TOXICITY:** Yes

**TERATOGENICITY:** No

**MUTAGENICITY:** No

#### COMPONENT ORAL TOXICITY

Toluene Oral LD50: Rat >5,580 mg/kg  
Ingestion may cause irritation of the gastrointestinal tract. Aspiration of the product into the lungs following ingestion may cause pulmonary injury leading to pneumonitis. May cause nausea, vomiting and diarrhea.

#### NOTES ON ORAL TOXICITY

#### COMPONENT DERMAL TOXICITY

Toluene Dermal LD50: Rabbit 12196 mg/kg  
Mild irritant to skin. May be absorbed through skin. Repeated or prolonged contact may cause defatting of the skin resulting in dryness, cracking and dermatitis.

#### NOTES ON DERMAL TOXICITY

#### COMPONENT INHALATION TOXICITY

Toluene Inhalation LC50 (4hr.)  
Rat 125 – 28.8 g/m<sup>3</sup>,  
May cause irregular heartbeat. The vapor has anesthetic properties when inhaled at concentrations above the occupational exposure limit, it may cause respiratory irritation, headache, fatigue, dizziness and incoordination. Avoid breathing vapor or mists.

#### NOTES ON INHALATION TOXICITY

### 12. Ecological Information

**POTENTIAL EFFECT ON ENVIRONMENT:** Do not allow to enter drains, sewers or watercourses.  
**MOBILITY:** Insoluble  
**POTENTIAL TO BIOACCUMULATE:** Unknown  
**AQUATIC TOXICITY:** Toxic to aquatic life

### 13. Disposal Considerations

**WASTE DISPOSAL METHOD:** Disposal should be in accordance with local, state or national legislation.  
**EMPTY CONTAINER WARNINGS:** Empty containers may contain product residue, follow MSDS and label warnings even after they have been emptied.

# Designer Molecules, Inc.

## Material Safety Data Sheet

Product: FM51-27N  
MSDS ID: FM51-27N

Revised Date: 04/21/20  
Replaces Date: New

### 14. Transport Information

<b>US DOT CLASSIFICATION:</b>	UN1993 Flammable Liquid N.O.S. (Toluene), Class 3, Group II
<b>CANADIAN TDG SURFACE:</b>	Class B Flammable liquid, div.2, (Toluene)
<b>IMDG CLASSIFICATION:</b>	UN1993 Flammable Liquid N.O.S. (Toluene), Class 3, Group II
<b>ICAO CLASSIFICATION:</b>	UN1993 Flammable Liquid N.O.S. (Toluene), Class 3, Group II
<b>IATA CLASSIFICATION:</b>	UN1993 Flammable Liquid N.O.S. (Toluene), Class 3, Group II

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized safety officer. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

### 15. Regulatory Information

**"This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR."**

**CANADIAN DSL/NDSL** Not listed.

**CALIFORNIA PROPOSITION 65:** This product contains the following chemicals that are known to the State of California to cause cancer, birth defects or other reproductive harm.

Component	CAS Number
Toluene	108-88-3

**TSCA INVENTORY STATUS:** Not listed. For R&D use only by trained professionals

SARA 313 TOXIC CHEMICALS:	Component	CAS Number
	Toluene	108-88-3

### 16. Other Information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgments of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user. While that data contained herein is factual, it should not be taken as warranty or representation for which the company assumes legal responsibility. It is offered solely for your consideration, investigation and verification. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.