

Material Name: DuraForm® GF

**I. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

**Product/Trade Name:** DuraForm® GF  
**Chemical Family:** Polyamide (nylon) Composite  
**Product Use:** Material for SLS® (selective laser sintering) systems

<b>Hazardous Materials Identification System (HMIS):</b>	
<i>(Degree of hazard: 0 = low, 4 = extreme):</i>	
Health	0
Flammability	1
Physical Hazards	0
<b>Personal Protection:</b>	
Dust mask, skin, eye protection	

Manufacturer:



Manufacturer Contact	3D Systems, Inc. 26081 Avenue Hall Valencia, CA 91355 U.S.A.
For Information	Phone: 970.257.4700 or Toll-free Phone: 800.793.3669
Emergency	800.424.9300 - Chemtrec

**II. COMPOSITION INFORMATION**

CAS #	Component	%
25038-74-8	Polyamide powder	40 – 55%
65997-17-3	Glass	45 – 60%

**Component Information**

This product is not considered to be hazardous according to 29CFR 1910.1200 (Hazard Communication Standard).

**III. HAZARDS IDENTIFICATION**

**Emergency Overview**

Product may form explosive dust/air mixtures if high concentration of product dust is suspended in air. This product is irritating to the eyes, respiratory system and skin. Avoid contact with eyes.

**Potential Health Effects:**

- Eyes:** This product can cause eye irritation. Symptoms include discomfort, itching and redness after contact.
- Skin:** This product can cause skin irritation. Symptoms include reversible redness, itching and/or pain.
- Ingestion:** Ingestion of large amounts can cause gastrointestinal irritation, vomiting, diarrhea and/or nausea.
- Inhalation:** This product can irritate the respiratory system. Symptoms include mild nasal and respiratory irritation, coughing, and difficulty breathing.

**Medical Conditions Aggravated by Exposure**

Could irritate an existing dermatitis or respiratory condition.

**IV. FIRST AID MEASURES**

- Eyes:** Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists.
- Skin:** Wash affected area with mild soap and water. Remove contaminated clothing. If irritation persists, get medical attention. Wash contaminated clothing before reuse.
- Ingestion:** If large quantities of this material are ingested, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.
- Inhalation:** If a problem develops, move affected person to fresh air, give artificial respiration if not breathing, and get medical attention immediately.



**Material Name: DuraForm® GF**

## V. FIRE FIGHTING MEASURES

Flash Point: >360 °F (183 °C)

Method Used: NA

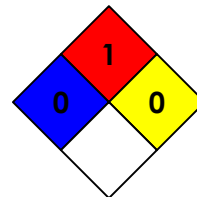
Upper Flammable Limit (UFL): NA

Lower Flammable Limit (LFL): NA

Auto Ignition: > 350 °C

Flammability Classification: NA

Rate of Burning: NA



NFPA Ratings  
 0 = Minimal  
 1 = Slight  
 2 = Moderate  
 3 = Serious  
 4 = Severe

General Fire Hazards: Dusts can form an explosive mixture with air.

Hazardous Combustion Products: Thermal decomposition products can include CO<sub>2</sub>, CO, NO<sub>x</sub>, and smoke.

Extinguishing Media: Use water mist, dry chemical, carbon dioxide, or chemical foam.

Fire Fighting Equipment/Instructions: Wear full protective clothing, including helmet, self-contained positive-pressure or pressure-demand breathing apparatus, protective clothing and facemask. Move container from area if it can be done without risk. Do not use high-volume water jet or high-pressure inert gas since pressure may cause dusting. Avoid inhalation of material or combustion by-products. Dust accumulation from this product can present an explosion hazard in the presence of an ignition source. For additional information, refer to National Fire Protection Association (NFPA) pamphlet #654, "Prevention of Fire and dust Explosion in the Chemical, Dye, Pharmaceutical and Plastics Industry".

## VI. ACCIDENTAL RELEASE MEASURES

Containment Procedures: Stop the flow of material, if this is without risk. Ventilate contaminated area. Eliminate sources of ignition. Avoid contact with water. Avoid the generation of dusts during clean up.

Clean-Up Procedures: Wear appropriate protective equipment and clothing, including a ground strap or conductive soled shoes, during clean up. Vacuum the dry powder into a closed container with internally and externally explosion-proof vacuum equipment with appropriate electrical classification per National Electrical Code, Article 502 or use non-sparking tools. Avoid the generation of dusts during clean up. Place material in an appropriate container for disposal.

Evacuation Procedures: Keep unnecessary personnel away.

Special Procedures: NA

## VII. HANDLING AND STORAGE

Handling Procedures: Avoid dust accumulation of this material to reduce potential explosions hazard. Use non-sparking tools when opening or closing containers. Use spark-proof, bonded, and grounded conveying and processing equipment to prevent static charge build-up. Keep this product from heat, sparks, or open flame.

Storage Procedures: Keep this material in a cool, dry, well-ventilated place. Avoid dust accumulation of this material. Eliminate all sources of ignition. Avoid contact with water or moisture. Keep separate from incompatible materials.

## VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION

### Exposure Guidelines

A: General Product Information: Follow all applicable exposure limits.

B: Component Exposure Limits:

	ACGIH TLV	OSHA PEL
Polyamide powder	10 mg/m <sup>3*</sup>	15 mg/m <sup>3*</sup>
Glass	10 mg/m <sup>3*</sup>	15 mg/m <sup>3*</sup>

\*This substance is regulated by OSHA as a Particulate Not Otherwise Regulated (PNOR). The exposure limits listed for both OSHA and ACGIH refer to total dust; the OSHA PEL for the respirable fraction is 5 mg/m<sup>3</sup>.

### Engineering Controls

Use explosion-proof local exhaust ventilation. Ventilation should effectively remove and prevent buildup of any dust generated from the handling of this product.

**Material Name: DuraForm® GF**

## PERSONAL PROTECTIVE EQUIPMENT

- Eyes/Face: Wear chemical goggles.
- Skin: Use impervious gloves and apron. If dust accumulation is possible, wear conductive-soled shoes or ground strap.
- Respiratory: If ventilation cannot effectively keep dust concentrations below established limits, appropriate NIOSH approved respiratory protection must be provided.
- General: An eye wash fountain is recommended.

## IX. PHYSICAL AND CHEMICAL PROPERTIES

Appearance.....	White powder	Odor.....	Mild
Physical State.....	Powder	PH.....	NA
Vapor Pressure.....	< 2 Pa @ 20°C	Vapor Density.....	NA
Boiling Point.....	>200°C	Melting/Freezing Point.....	175 – 190 °C
Solubility (H <sub>2</sub> O).....	insoluble @ 20°C	Specific Gravity.....	1.0 – 1.5
Percent Volatile.....	<1%	Molecular Weight.....	NA

## X. CHEMICAL STABILITY AND REACTIVITY

- Chemical Stability: Stable under normal conditions of handling, use and transportation.
- Conditions to Avoid: Avoid dispersion of dust in air. Avoid ignition sources where dust is produced. Avoid incompatible materials. Avoid heating above the thermal decomposition temperature (>340 °C).
- Incompatibility: Oxidizing materials, strong acids and strong bases.
- Hazardous Decomposition: Thermal decomposition products can include CO<sub>2</sub>, CO, NO<sub>x</sub>, and smoke.
- Hazardous Polymerization: Will not occur.

## XI. TOXICOLOGICAL INFORMATION

### Acute and Chronic Toxicity

- A: General Product Information: Single exposure (acute) studies indicate that this material is non-irritating to rabbit skin (4-hr exposure; 0/8) No genetic changes were observed in tests using bacteria.

### Carcinogenicity

- A: General Product Information: This product is not listed by ACGIH, IARC, OSHA, NIOSH, or NTP.

## XII. ECOLOGICAL INFORMATION

### Ecotoxicity

- A: General Product Information: The ecological assessment of this material is based on an evaluation of its components. This product is classified as not dangerous to the environment.
- B: Component Analysis - Ecotoxicity - Aquatic Toxicity: No ecotoxicity data are available for this product, however, it is not predicted to be toxic to aquatic organisms or to cause long-term adverse effects in the aquatic environment.
- Environmental Fate: No information available for product.

## XIII. DISPOSAL CONSIDERATIONS

### US EPA Waste Number & Descriptions

- A: General Product Information: No EPA Waste Numbers are applicable for this product. This product is not defined or designates as hazardous by current provisions of RCRA – 40CFR261.

# Material Safety Data Sheet

Material Name: DuraForm® GF

Disposal Instructions: Avoid disposal. If possible, completely utilize product. Dispose of unused product in accordance with applicable Federal, State, Provincial, or Local regulations.

## XIV. TRANSPORT INFORMATION

	US DOT	RID/ADR	IMDG	IATA	IMO	Canada TDG
Shipping Name	Not Regulated					
Hazard Class:						
UN Number:						
Packing Group:						

## XV. REGULATORY INFORMATION

### US FEDERAL

TSCA:.....All materials are listed on the TSCA Inventory

SARA 302 EHS List (40 CFR 355 Appendix A):.....Not listed

SARA 313 (40 CFR 372.65):.....Not listed

CERCLA (40 CFR 302.4):.....Not listed

### STATE RIGHT-TO-KNOW STATUS

The following components appear on one or more of the following state hazardous substances lists:

Component	CA Prop. 65	MA	MN	NJ	PA	RI
None listed	--	--	--	--	--	--

### Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List: None

### Component Analysis - Inventory

Component/CAS	EC #	EEC	CAN	TSCA	NLP
Polyamide powder / 25038-74-8	-	No	DSL	Yes	No
Glass / 65997-17-3	266-046-0	EINECS	DSL	Yes	No

## XVI. ADDITIONAL INFORMATION

MSDS Creation Date: .... August 24, 2001

MSDS Revision #: ..... 3

MSDS Revision Date:.... February 15, 2005

Reason for Revision: ..... update regulatory status

For more information: .... [www.3dsystems.com](http://www.3dsystems.com)

800.793.3669 (Toll-free in the US GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

970.257.4700 (Outside the U.S. GMT-07:00; N. America, Mon – Fri, 6:00 a.m. to 6 p.m.)

+49 (0) 6151 357-357 (Europe GMT+01:00; Mon – Fri, 08:00 a.m. - 17:00 p.m. MEZ)

DISCLAIMER OF LIABILITY: The following supersedes any provision in your company's forms, letters, and papers. 3D Systems, Inc. makes no warranty whether expressed or implied, including warranties of merchantability or of fitness for a particular purpose for this product. No statements or recommendations contained in the product literature are to be construed as inducements to infringe any relevant patent now or hereafter in existence. Under no circumstances shall 3D Systems, Inc. be liable for incidental, consequential, or other damages from alleged negligence, breach or warranty, strict liability or any other theory, arising out of the use or handling of this product. The sole liability of 3D Systems, Inc. for any claims arising out of the manufacture, use or sale of its products shall be for the buyer's purchase price.

© Copyright 2005 by 3D Systems, Inc. All rights reserved. Subject to change without notice. DuraForm and SLS are registered trademarks of 3D Systems, Inc., and the 3D Systems logo is a trademark of 3D Systems, Inc.



## Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists

CAS = Chemical Abstracts Service

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CFR = Code of Federal Regulations

CPR = Controlled Products Regulations

DOT = Department of Transportation

DSL = Domestic Substances List

EINECS = European Inventory of Existing Commercial Chemical Substances

EPA = Environmental Protection Agency

IARC = International Agency for Research on Cancer

IATA = International Air Transport Association

IDL = Ingredients Disclosure List

mg/Kg = milligrams per Kilogram

mg/L = milligrams per Liter

mg/m<sup>3</sup> = milligrams per Cubic Meter

MSHA = Mine Safety and Health Administration

NA = Not Applicable or Not Available

NIOSH = National Institute for Occupational Safety and Health

NJTSR = New Jersey Trade Secret Registry

NTP = National Toxicology Program

OSHA = Occupational Safety and Health Administration

SARA = Superfund Amendments and Reauthorization Act

STEL = Short Term Exposure Limit

TDG = Transport Dangerous Goods

TSCA = Toxic Substances Control Act

WHMIS = Workplace Hazardous Materials Information System.