



HMIS	
Health:	2 (moderate)
Fire:	0 (least)
Reactivity:	0 (least)
Protection:	E (safety glasses, gloves & dust respirator)

MATERIAL SAFETY DATA SHEET

Section I: Product Identification

Name used on Label: **DuraForm™ GF**
 Chemical Name: Proprietary Polymer Resin
 (if single substance)
 Chemical Family: Polyamide Composite
 Product Use: Material for Selective Laser Sintering

Manufacturer: DTM Corporation
 1611 Headway Circ., Build. 2
 Austin, Texas 78754

For information Call: (512) 339-2922 (8:00 a.m. - 5:00 p.m.)
 Emergency Call (CHEMTREC): (800) 424-9300

Section II: Ingredients

Identity	CAS No.	Weight %	PEL	TLV
Polymer resin (proprietary)		49.9	N/E	*6 mg/m ³
Additives				
Glass	65997-17-3	50	N/E	N/E
Other (proprietary)		0.1	15 mg/m ³	10 mg/m ³

PEL and TLV values are reported as TWA unless otherwise noted.

* = Finest powder as nuisance dust

Identity (remarks):

The specific identity of the resin and the additive, "other" is withheld as a trade secret.

Section III: Hazards identification

The components of the DuraForm GF material are not included on the OSHA list of Toxic and Hazardous Contaminants (29CFR 1910.1000). This standard, however, provides Permissible Exposure Limits (PEL) for inert or nuisance dusts. Threshold Limit Values (TLV) for some nuisance particulates have also been established by the American Conference of Governmental Industrial Hygienists (ACGIH). The table below provides the established standards expressed as 8-hour time-weighted averages.

	Total Dust	Respirable Fraction ≤10 microns
OSHA (PEL)	15 mg/m ³	5 mg/m ³
ACGIH (TLV)	10 mg/m ³	5 mg/m ³

Dust from the DuraForm GF material is expected to be the primary hazard in an occupational exposure. Follow good industrial hygiene practices and exercise care when dumping bags, sweeping, mixing or doing other tasks which can create dust.

Wear appropriate protective equipment for nuisance dust when handling the powder. Avoid contact with eyes, skin and clothing. Use with adequate ventilation. Wash thoroughly after handling.

Primary routes of entry	Yes - EYE; Yes - SKIN; Yes - INGESTION; Yes - INHALATION
Eye contact	Dust or vapors that contact the eye may be irritating or cause mechanical injury.
Skin contact	May cause slight skin irritation. Molten material will produce thermal burns.
Ingestion	It is reasonable to anticipate ingestion of powder would be irritating to the GI tract.
Inhalation	Dust or vapors may be irritating to the respiratory tract and cause coughing or sneezing.
Chronic toxicity	No effects from chronic exposure are known.
Medical conditions prone to aggravation by exposure	As with any organic compound that is heated to vaporization, exposure may aggravate pre-existing conditions such as colds, allergies, asthma, emphysema and psoriasis.
Toxicology	Carcinogenicity: No - NTP No - IARC

Section IV: First Aid Measures

Eyes	Immediately flush eyes with flowing water for at least 15 minutes. See a physician if the irritation persists.
Skin	Wash thoroughly with soap and water. See a physician if the irritation persists.
Ingestion	No harmful effects are anticipated if the powder is swallowed. See a physician if irritation occurs.
Inhalation	No harmful effects are anticipated from breathing dust or a low concentration of vapors. If a problem develops, remove the person to the fresh air and supply oxygen if necessary.

Section V: Fire and Explosion Data

Unusual fire and explosion hazards	Avoid dust clouds and accumulation to minimize the potential for explosions. Keep away from heat, sparks, flame and all other ignition sources. For additional information, refer to NFPA pamphlet #654, "PREVENTION OF FIRE AND DUST EXPLOSION IN THE CHEMICAL, DYE, PHARMACEUTICAL AND PLASTICS INDUSTRY."
Flash Point (Test Method)	N/A
Autoignition Temperature	450-600 °C
Flammable Limit	LEL= 40-70 g/m ³ UEL=N/A
Extinguishing media	Water spray, carbon dioxide, foam or dry chemical

Special fire fighting procedures	In the event of fire, wear full protective clothing and NIOSH approved self-contained breathing apparatus with full face piece, operated in the positive pressure mode.
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Section VI: Accidental Release

Spill or leak procedures	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. Wear appropriate respiratory protection and protective clothing as described in Section VIII. Transfer to closed containers for disposal.
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Section VII: Handling and Storage

Storage and handling	Avoid dispersion of dust in to air to reduce potential explosions hazard. Eliminate ignition sources. Conveying and processing equipment should be spark proof, bonded, and grounded to prevent static charge build-up. Maintain good house keeping standards to prevent accumulation of dust. Refer to NFPA pamphlet #654, "PREVENTION OF FIRE AND DUST EXPLOSION IN THE CHEMICAL, DYE, PHARMACEUTICAL AND PLASTICS INDUSTRY." Keep powder dry and away from acids and strong oxidizing agents. Store material in closed containers.
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Section VIII: Special Precautions

Ventilation	Provide local exhaust ventilation where heat can cause polymer breakdown, e.g. extrusion, molding and where there is a need to draw dusts and fumes from worker breathing zones. The following publication offers ventilation guidelines and techniques: "Industrial Ventilation, A Manual of Recommended Practice" available from ACGIH.
Respiratory protection	For conditions where exposure to dust and fumes is apparent, a NIOSH approved respirator for dust, mist and fumes appropriate to the airborne concentration may be worn. Where vapors are generated, a NIOSH approved organic respirator suitable to the airborne concentration is recommended.
Eye and face protection	Safety glasses with side shields are recommended for any type of powder handling. Dust-tight goggles are recommended for dusty operations and areas where vapors accumulate.
Protective clothing	Wear clean body covering and gloves impervious to dust or vapor to minimize skin contact.

Section IX: Physical Data

Boiling point, °C	N/A	Melting point, °C	170
Specific gravity, g/cm ³	Approx. 1.5	Vapor pressure @ 20°C	N/A
Vapor density (Air = 1)	N/A	Evaporation rate (Butyl acetate = 1)	N/A
% volatiles	N/A	Solubility in water:	Negligible
Appearance and odor	White, odorless powder		

Section X: Stability and Reactivity Data

Stability	Compound is stable
Conditions to avoid	Heating above 340°C
Incompatibility (materials to avoid)	Acids and strong oxidizing agents
Hazardous polymerization	Does not occur
Hazardous decomposition products	At high temperatures, decomposition products such as CO ₂ , CO, smoke and NO _x may be formed.

Section XI: Toxicological Information

See section III	
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Section XII: Environmental Information

Superfund	The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) or "Superfund" levies a tax on hazardous waste materials expected to remain at a hazardous waste disposal facility after its closure (i.e., landfills). The DuraForm GF material and items produced from this material are not regulated as hazardous wastes and are not subject to this Superfund tax.
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Section XIII: Disposal Consideration

Waste disposal method	Dispose of waste in a licensed landfill or by incineration in accordance with federal, state and local regulations. For waste disposal purposes, the DuraForm GF material is not defined or designated as hazardous by current provisions of the Federal Resource Conservation and Recovery Act (RCRA – 40CFR261).
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Section XIV: Transportation Information

Transportation	<p>For domestic transportation purposes, powder compounds are not classified as hazardous by the U.S. Department of Transportation under Title 49 of the Code of Federal Regulations.</p> <ul style="list-style-type: none"> • DOT Proper Shipping Name: Synthetic Resin, powders • DOT Hazard Class: Not applicable • DOT Label: Not applicable • UN/NA Hazard No.: Not applicable • Reportable Quantity: Not applicable • DOT ID#: 156200
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Section XV: Regulatory Information

SARA Hazard Classification	Immediate (Acute) Health:	Yes
	Delayed (Chronic) Health:	No
	Sudden Release of Pressure:	No
	Reactive:	No
	Fire:	No

SARA Title III, Section 302	This product does not contain any chemicals currently on the Extremely Hazardous Substance List, Section 302, SARA Title III.
SARA Title III, Section 313	This product does not contain any chemicals currently on the Toxic Chemical List, Section 313, SARA Title III.
TSCA Inventory Status	All ingredients of this product are listed on the Toxic Substances Control Act (TSCA) inventory.
WHMIS Classification:	Class D, Division 2, Subdivision B

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PREPARED: DTM CORPORATION

DATE 21 OCTOBER, 1998

FOR FURTHER INFORMATION, CONTACT:

**SLS MATERIALS GROUP
DTM CORPORATION
1611 HEADWAY CIRCLE
BUILDING 2
AUSTIN, TEXAS 78754**