

1. PRODUCT AND COMPANY IDENTIFICATION**MANUFACTURER'S NAME:** Fenner Drives**ADDRESS:** 311 W. Stiegel Street, Manheim, PA 17545**TELEPHONE NO.** +1.717.665-2421 (Monday – Friday, 8:00 a.m. – 5:00 p.m., EDT)**PRODUCT NAME &/OR NUMBER:** NinjaFlex 3D Printing Filament (all colors)**TRADE NAME & SYNONYM:** NinjaFlex 3D Printing Filament**CHEMICAL NAME & SYNONYM:** Thermoplastic polyurethanes**CHEMICAL FAMILY:** Mixture **FORMULA:** Not Applicable**2. HAZARDS IDENTIFICATION****EMERGENCY OVERVIEW**

Various clear or colored odorless solids

The solid material is not hazardous and is not expected to cause irritation

Hazardous airborne contaminants may occur during decomposition such as in fused deposition modeling processes

Under hot melt processing conditions, wear personal protective equipment to prevent thermal burns

During a fire, irritating and highly toxic gases may be generated

POTENTIAL HEALTH EFFECTS**ACUTE TOXICITY:****IRRITATION/CORROSION:** Not likely to result in irritation in solid form. Thermal decomposition may result in release of toxic airborne contaminants which can be irritating to eyes, skin and respiratory tract.**SENSITIZATION:** The chemical structure does not suggest a sensitizing effect.**CHRONIC TOXICITY:****CARCINOGENICITY:** The chemical structure does not suggest a specific alert for such an effect.**REPEATED DOSE TOXICITY:** No known chronic effects.**GENOTOXICITY:** The chemical structure does not suggest a mutagenic effect.**3. COMPOSITION / INFORMATION ON INGREDIENTS**

COMPONENT	Color	CAS NO.	%	EXPOSURE LEVEL
Colorants: (only those present @ ≥ 1% in ≥ 1 pigment formulations)		Note: Colorants comprise 0-5% of any given formulation		
- Aluminum Hydroxide (as AL)	Blue	21645-51-2	≤ 0.01	None established
- Carbon Black	Black	1333-86-4	≤ 4.00	OSHA PEL = ACGIH TLV = 3.5 mg/M3
- Ethylene Bisstearamide	Blue, Red, Black	110-30-5	≤ 4.00	None established
- Limestone (Total Dust)	Red	1317-65-3	≤ 20.0	OSHA PEL = 15.0 mg/M3, ACGIH TLV = 10mg/M3
-Silica, Crystalline Quartz	Red	14808-60-7	≤ 0.06	OSHA PEL = ACGIH TLV = 0.1 mg/M3
- Silicon Dioxide, Amorphous	Blue	7631-86-9	≤ 0.02	OSHA PEL = 6.0 mg/M3, ACGIH TLV = 10mg/M3
- Stearic Acid	Red	57-11-4	≤ 0.40	None established
- Titanium Dioxide (Total Dust)	Blue	13463-67-7	≤ 0.16	OSHA PEL = 10 mg/M3; ACGIH TLV = 10 mg/M3
Thermoplastic Polyurethane Resins	All colors	Proprietary	100.0	None established

Note: These chemicals are bound within the applicable polymer structures and are not expected to be a health hazard

FIRST AID MEASURES

INGESTION: Rinse mouth and then drink plenty of water. Do not induce vomiting. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

SKIN: Solid material is not expected to pose a hazard in normal use, however skin contact with hot molten substance/product may cause thermal burns.

EYES: Fumes or vapors may cause slight irritation during fused deposition modeling process.

INHALATION: Not likely to result in irritation in solid form. Thermal decomposition may result in release of toxic airborne contaminants. Remove exposed individual to fresh air and keep the person calm. Assist in breathing if necessary. Immediate medical attention required

NOTES TO PHYSICIAN: No specific antidote. Use supportive care. Treatment based on physician's judgment in response to patient's reactions.

4. FIRE FIGHTING MEASURES

AUTOIGNITION: >400°C

EXTINGUISHING MEDIA: water, foam, dry extinguishing media, carbon dioxide.

FIREFIGHTING HAZARDS: carbon monoxide, carbon dioxide, hydrogen cyanide, nitrogen oxides, isocyanate The substances/groups of substances mentioned can be released in case of fire.

FIRE-FIGHTING EQUIPMENT: Use self-contained breathing apparatus.

FUTHER INFORMATION: Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

5. ACCIDENTAL RELEASE MEASURES

Normal housekeeping or clean-up to avoid tripping hazard. Keep from entering sewers, lakes or streams. Industrial waste incineration is the recommended method of disposal, to be performed in accordance with Federal, State and local regulations.

6. HANDLING AND STORAGE**HANDLING**

GENERAL ADVICE: Provide suitable exhaust ventilation in the area surrounding the melt outlet of fused deposition modeling printer.

SPECIAL PRECAUTIONS: Wear gloves when handling hot material.

STORAGE:

GENERAL ADVICE: Store in original containers at ambient environmental conditions. Segregate from foods and animal feeds.

7. EXPOSURE CONTROLS / PERSONAL PROTECTION

VENTILATION: During fused deposition modeling operations, use with ventilation adequate to reduce levels of air contaminants below that which may cause personal injury or illness. Local exhaust ventilation that removes air contaminants from the breathing zone is preferred. General, mechanical, or dilution ventilation may be suitable.

RESPIRATORY PROTECTION: Wear a NIOSH-certified (or equivalent) organic vapor respirator as needed.

SKIN PROTECTION: Wear gloves when handling hot materials.

EYE/FACE PROTECTION: Wear splash goggles to protect from hot molten substance/product.

GENERAL: Wear protective clothing to prevent contact during hot melt conditions. When using, do not eat, drink or smoke. After use wash hands with soap and water.

9. PHYSICAL AND CHEMICAL PROPERTIES*

FORM: Filament, Solid

ODOR: Odorless

COLOR: Various (Red, White, Blue or Black)

pH: Not applicable

Specific Gravity (H₂O=1): 1.1 – 1.3

SOFTENING TEMPERATURE: >120°C

DENSITY: Approx. 1.2 g/cm³ (20°C)

BULK DENSITY: 500-700 kg/m³ (20°C)

PARTITIONING COEFFICIENT n-

OCTANOL/WATER (log Pow): Not applicable

10. STABILITY AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide, hydrogen cyanide

THERMAL DECOMPOSITION: No decomposition if stored and handled as prescribed/indicated. Thermal decomposition above the indicated temperature is possible (> 230 °C). Prolonged thermal loading can result in products of degradation being given off.

CONDITIONS TO AVOID: No conditions known that should be avoided.

INCOMPATIBLE MATERIALS: No substances known that should be avoided.

POSSIBILITY OF HAZARDOUS REACTIONS: The product is chemically stable. No hazardous reactions if stored and handled as prescribed/indicated.

CORROSION to METALS: No corrosion effect on metal.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY: Oral

TYPE OF VALUE: LD50

SPECIES: Rat

VALUE: >5000 mg/kg

12. ECOLOGICAL INFORMATION

DEGRADABILITY/PERSISTENCE BIOLOGICAL/ABIOLOGICAL DEGRADATION EVALUATION: Poorly biodegradable

13. DISPOSAL CONSIDERATIONS

Waste disposal of substance:

Incinerate in a licensed facility. Do not discharge substance/product into sewer system. Dispose of in a licensed facility.

Container disposal:

Dispose of in accordance with national, state and local regulations.

14. TRANSPORT INFORMATION

U.S. Department of Transportation (US DOT): Not classified as a dangerous good under transportation regulations.

International Air Transport Association (IATA/ICAD): Not classified as a dangerous good under transportation regulations.

International Maritime Dangerous Goods (IMDG): Not classified as a dangerous good under transportation regulations.

15. REGULATORY INFORMATION

TSCA (Toxic Substances Control Act): All components of this material appear on the Inventory of Chemical Substances published by the US Environmental Protection Agency (EPA) under the authority of the Toxic Substance Control Act (TSCA).

OSHA HAZARD CATEGORY: Chronic target organ effects reported.

SARA Title III (Superfund Amendments & Reauthorization Act):

311/312 Hazard Categories (for the compounded products): Acute – No. Chronic – Yes. Fire – No. Reactive – No. Pressure – No.

313 Reportable Ingredients: As of the preparation date of this MSDS, one or more of the ingredients in one or more of these products contained substances subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372. This information must be included in all MSDSs that are copied and distributed for this material. **NONE**

CERCLA (Comprehensive Response Compensation and Liability Act): Not Reportable. Contact local authorities to determine if there may be other local reporting requirements.

WHMIS (Workplace Hazardous Materials Identification System): This MSDS has been prepared to meet WHMIS requirements except for use of the 16 headings.

NinjaFlex Black: Carbon Black – D2A

NinjaFlex Blue: Titanium Dioxide – D2B

EINECS: All components of this product are on the European Inventory of Existing Commercial Chemical Substances.

NEHAPS (National Environmental Health Action Plans): Contains no regulated substances.

EU CLASSIFICATION AND LABELING INFORMATION: Not applicable. **EU Risk Phrases:** Not applicable.

EU Safety Phrases: Not applicable.

VOLATILE ORGANIC COMPOUNDS (VOC): Not applicable.

STATE RIGHT-TO-KNOW REQUIREMENTS:

Chemical Name:	NinjaFlex Color	State(s)	
Acrylonitrile	Blue	CA, MA, MI, MN, NJ, PA, WA	< 100 ppm
PCBs (≤ 25 ppm)	Blue	CA	
Polyurethane Polyester Elastomer	All colors	NJ, PA	
Silica, Crystalline	Red	CA	

Note: These chemicals are bound within the applicable polymer structures and are not expected to be a health hazard.

HMIS® HAZARD CLASSIFICATION: Health: 1 Fire: 0 Reactivity: 0

NFPA HAZARD CLASSIFICATION: Health: 1 Fire: 0 Reactivity: 0

NFPA and HMIS use a numbering scale ranging from 0-4 to indicate the degree of hazard. A value of zero means that the substance possesses essentially no hazard; a rating of four indicates extreme danger. Although similar, the two rating systems are intended for different purposes, and use different criteria. The NFPA system was developed to provide an on-the-spot alert to the hazards of a material, and their severity, to emergency responders. The HMIS system was designed to communicate workplace hazard information to employees who handle hazardous chemicals.

16. OTHER INFORMATION**REVISION SUMMARY for MSDS No. NinjaFlex****Date Prepared:** October 3, 2013**Last Revised:** n/a**Previous Revision:** n/a**Summary of Revisions:**

10/03/13 - New MSDS

This information relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process. The information is derived from the best available sources and is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of this product are not within the control of Fenner Drives, it is the user's responsibility to determine the suitability and completeness of this information, and the conditions of safe use of the product, for his own particular use.