

Safety Data Sheet

Material Name: ABS 3D Printer Filament/ MakerBot ABS

SDS ID: MB-001_US

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name

ABS 3D Printer Filament/ MakerBot ABS

Synonyms

Acrylonitrile-Butadiene-Styrene Copolymer.

Chemical Family

polymer, copolymer.

Product Use

3D Printing

Restrictions on Use

Do not use in printers where temperatures exceed 250°C.

Details of the supplier of the safety data sheet

MakerBot Industries LLC

One MetroTech Center

Brooklyn, NY 11201

USA

Emergency Phone #: MakerBot (347) 334-6800

E-mail: Edwin.Meek@makerbot.com

Emergency Poison Control Hot Line : 1 (800) 222-1222

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.

None needed according to classification criteria

GHS Label Elements**Symbol(s)**

None needed according to classification criteria

Signal Word

None needed according to classification criteria

Hazard Statement(s)

None needed according to classification criteria.

Precautionary Statement(s)**Prevention**

None needed according to classification criteria.

Response

None needed according to classification criteria.

Storage

None needed according to classification criteria.

Disposal

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Dispose of contents/container in accordance with local/regional/national/international regulations.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
9003-56-9	ABS resin	> 98
100-42-5	Styrene	< 0.1

Section 4 - FIRST AID MEASURES

Inhalation

Heating may release vapors which may be irritating. In case of inhalation of decomposition products, affected person should be moved into fresh air and kept still. Get medical advice/attention.

Skin

It is unlikely that first aid will be required. IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention.

Eyes

It is unlikely that first aid will be required. Dust may be irritating to the eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention, if needed.

Ingestion

IF SWALLOWED: Rinse mouth. Get immediate medical advice/attention.

Indication of any immediate medical attention and special treatment needed

First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. Treat symptomatically and supportively.

Most Important Symptoms/Effects

Acute

Molten material may cause thermal burns.

Delayed

No information on significant adverse effects.

Note to Physicians

Treat symptomatically. Give artificial respiration if not breathing.

Antidote

None known. Treat symptomatically and supportively.

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media

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Suitable Extinguishing Media

water, foam, regular dry chemical

Unsuitable Extinguishing Media

None known

Special Hazards Arising from the Chemical

Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Hazardous Combustion Products

oxides of carbon, oxides of nitrogen, HCN, acrylonitrile, styrene monomer.

Fire Fighting Measures

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.

Special Protective Equipment and Precautions for Firefighters

Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

No measures required.

Methods and Materials for Containment and Cleaning Up

Collect spilled material in appropriate container for disposal. Dispose in accordance with all applicable regulations.

Environmental Precautions

Avoid release to the environment. Comply with all applicable regulations on spill and release reporting. Prevent entry into waterways, sewers, basements, or confined areas.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations.

Conditions for Safe Storage, Including any Incompatibilities

None needed according to classification criteria.

Store in a cool dry place. Store below 50 C. Avoid heat, flames, sparks and other sources of ignition. Keep away from incompatible materials.

Incompatible Materials

Oxidizing agents.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

Styrene	100-42-5
ACGIH:	20 ppm TWA
	40 ppm STEL
NIOSH:	50 ppm TWA; 215 mg/m ³ TWA
	100 ppm STEL; 425 mg/m ³ STEL
	700 ppmIDLH
OSHA (US):	100 ppm TWA
	200 ppm Ceiling
Mexico:	50 ppm TWA LMPE-PPT; 215 mg/m ³ TWA LMPE-PPT
	100 ppm STEL [LMPE-CT]; 425 mg/m ³ STEL [LMPE-CT]
	Skin - potential for cutaneous absorption

EU - Occupational Exposure (98/24/EC) - Binding Biological Limit Values and Health Surveillance Measures

There are no biological limit values for any of this product's components.

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)

Styrene (100-42-5)

400 mg/g creatinine Medium: urine Time: end of shift Parameter: Mandelic acid plus phenylglyoxylic acid (nonspecific); 40 µg/L Medium: urine Time: end of shift Parameter: Styrene

Engineering Controls

Provide local exhaust ventilation system. Ventilation should be sufficient to effectively remove and prevent buildup of any dusts or fumes that may be generated during handling or thermal processing.

Individual Protection Measures, such as Personal Protective Equipment

Eye/face protection

None during normal use. Protect against molten solid.

Skin Protection

None during normal use. Protect against molten solid.

Respiratory Protection

No respirator is required under normal conditions of use. If respirable dusts are generated, respiratory protection may be needed.

Glove Recommendations

Protect against molten solid. In the molten form, Wear protective gloves.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

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Appearance	Spool,string,strand	Physical State	solid
Odor	odorless,sweet,plastic	Color	clear,translucent,opaque
Odor Threshold	varies	pH	Not available
Melting Point	Softening above 100 °C	Boiling Point	Not available
Freezing point	Not available	Evaporation Rate	Not available
Boiling Point Range	Not available	Flammability (solid, gas)	Not available
Autoignition	466 °C	Flash Point	404 °C
Lower Explosive Limit	45 g/m³	Decomposition	>250 °C
Upper Explosive Limit	Not available	Vapor Pressure	Not available
Vapor Density (air=1)	Not available	Specific Gravity (water=1)	1.03 - 1.1
Water Solubility	Insoluble	Partition coefficient: n-octanol/water	Not available
Viscosity	Not available	Solubility (Other)	Not available
Density	Not available	Molecular Weight	Not available

Section 10 - STABILITY AND REACTIVITY

Reactivity

The product is chemically stable under recommended conditions of storage, use and temperature.

Chemical Stability

Stable under normal conditions of use.

Possibility of Hazardous Reactions

Will not polymerize.

Conditions to Avoid

Avoid contact with temperatures above 250 C.

Incompatible Materials

Oxidizing agents.

Hazardous decomposition products

oxides of carbon, oxides of nitrogen, HCN, acrylonitrile, styrene monomer

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Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Inhalation

No hazard is expected from the normal use of this product. Dust may cause irritation of the nose, throat and upper respiratory tract.

Skin Contact

Molten material may cause burns.

Eye Contact

Molten material may cause burns.

Ingestion

No information on significant adverse effects.

Acute and Chronic Toxicity

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

Styrene (100-42-5)

Oral LD50 Rat 1000 mg/kg

Inhalation LC50 Rat 11.7 mg/L 4 h

Immediate Effects

Molten material may cause thermal burns.

Delayed Effects

No information on significant adverse effects.

Irritation/Corrosivity Data

No data available.

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Component Carcinogenicity

ABS resin	9003-56-9
IARC:	Supplement 7 [1987]; Monograph 19 [1979] (Group 3 (not classifiable))
Styrene	100-42-5
ACGIH:	A4 - Not Classifiable as a Human Carcinogen
IARC:	Monograph 82 [2002]; Monograph 60 [1994] (Group 2B (possibly carcinogenic to humans))
NTP:	Reasonably Anticipated To Be A Human Carcinogen
DFG:	Category 5 (low carcinogenic potency)

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OSHA:	Present
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Germ Cell Mutagenicity

No data available.

Tumorigenic Data

No data available

Reproductive Toxicity

No effects are expected due to the low concentration of the component(s).

Specific Target Organ Toxicity - Single Exposure

No data available.

Specific Target Organ Toxicity - Repeated Exposure

No data available.

Aspiration hazard

No data available.

Medical Conditions Aggravated by Exposure

No data available.

Section 12 - ECOLOGICAL INFORMATION

Component Analysis - Aquatic Toxicity

Styrene	100-42-5
Fish:	LC50 96 h Pimephales promelas 3.24 - 4.99 mg/L [flow-through]; LC50 96 h Lepomis macrochirus 19.03 - 33.53 mg/L [static]; LC50 96 h Pimephales promelas 6.75 - 14.5 mg/L [static]; LC50 96 h Poecilia reticulata 58.75 - 95.32 mg/L [static]
Algae:	EC50 72 h Pseudokirchneriella subcapitata 1.4 mg/L IUCLID; EC50 96 h Pseudokirchneriella subcapitata 0.72 mg/L IUCLID; EC50 72 h Pseudokirchneriella subcapitata 0.46 - 4.3 mg/L [static] EPA; EC50 96 h Pseudokirchneriella subcapitata 0.15 - 3.2 mg/L [static] EPA
Invertebrate:	EC50 48 h Daphnia magna 3.3 - 7.4 mg/L EPA

Persistence and Degradability

No information available for the product.

Bioaccumulative Potential

No information available for the product.

Mobility

No information available for the product.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

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Dispose of contents/container in accordance with local/regional/national/international regulations. Avoid release to the environment. Incineration should be done in accordance with prevailing municipal, state, and federal laws and standards from local environmental agencies.

Section 14 - TRANSPORT INFORMATION

US DOT Information:

UN/NA #: Not regulated

International Bulk Chemical Code

This material contains one or more of the following chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

Styrene	100-42-5
IBC Code:	Category Y

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

Styrene	100-42-5
SARA 313:	0.1 % de minimis concentration
CERCLA:	1000 lb final RQ; 454 kg final RQ

SARA Section 311/312 (40 CFR 370 Subparts B and C)

Acute Health: No **Chronic Health:** No **Fire:** No **Pressure:** No **Reactivity:** No

U.S. State Regulations

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

Component	CAS	CA	MA	MN	NJ	PA
Styrene	100-42-5	Yes	Yes	Yes	Yes	Yes

Not listed under California Proposition 65

Canadian WHMIS Ingredient Disclosure List (IDL)

Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which meet WHMIS criteria specified in the Controlled Products Regulations and are present above the threshold limits listed on the IDL

Styrene	100-42-5
	0.1 %

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Component Analysis - Inventory

ABS resin (9003-56-9)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR - KECI/KECL	KR - TCCA	CN	NZ	MX	TW
Yes	DSL	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes

Styrene (100-42-5)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR - KECI/KECL	KR - TCCA	CN	NZ	MX	TW
Yes	DSL	EIN	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes

Section 16 - OTHER INFORMATION

NFPA Ratings

Health: 0 Fire: 1 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Summary of Changes

New SDS : 08/24/2015

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States.

Other Information

Disclaimer:

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Supplier gives no warranty whatsoever, including the warranties of merchantability or of fitness for a particular purpose. Any product purchased is sold on the assumption the purchaser shall determine the quality and suitability of the product. Supplier expressly disclaims any and all liability for incidental, consequential or any other damages arising out of the use or misuse of this product. No information provided shall be deemed to be a recommendation to use any product in conflict with any existing patent rights.

MATERIAL SAFETY DATA SHEET

Prusament PETG by Prusa Polymers

conforms to Regulation EC No. 1907/2006 (REACH)

1. IDENTIFICATION OF THE SUBSTANCE AND THE COMPANY

Product name: Prusament PETG, all colours

Chemical name: **Copolyester**

Chemical family: **Thermoplastic**

Application: **filaments for 3D printing**

Manufacturer/Supplier:

Prusa Research s.r.o.

Partyzánská 188/7a

17000 Praha 7

Czech Republic

IČ: 24213705

+420 222 263 718

info@prusa3d.cz

2. HAZARD IDENTIFICATION

2.1 CLASSIFICATION OF SUBSTANCE OR MIXTURE

Classification: **(Regulation (EC) No 1272/2008) Not a hazardous substance or mixture.**

2.2 LABEL ELEMENTS

Symbols/Pictograms: **None**

Signal Words: **None**

Hazard statement: **None**

Precautionary statement: **None**

PBT and vPvB substances: **No data available**

2.3 OTHER HAZARDS

None known.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Chemical name: **Copolyester**

Product based on copolyester with additives.

Copolyester concentration >97%

Classification:

Chemical name	Classification	
copolyester	DSD:	This substance is not classified according to Directive 67/548/EEC
copolyester	CLP:	NOT CLASS,

DSD: Directive 67/548/EEC.

CLP: Regulation No. 1272/2008.:

4. FIRST AID MEASURES

4.1 DESCRIPTION OF FIRST AID MEASURES

Inhalation: After inhalation of decomposition products of polymer, take affected persons to fresh air. Call a doctor if necessary.

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention immediately.

Skin contact: After contact with hot polymer cool skin rapidly with cold water. Call a doctor if necessary.

Ingestion: Call doctor or consider to induce vomiting. Rinse mouth with water. Call a doctor if necessary.

4.2 MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED:

Burns should be treated as thermal burns. The material will come off as healing occurs; therefore, immediate removal from the skin is not necessary.

4.3 INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED

Hazards: Contact with molten substance/product may cause severe burns to skin and eyes.

Treatment: Treat symptomatically.

5. FIREFIGHTING MEASURES

General fire hazards: Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or grounding procedures.

5.1 EXTINGUISHING MEDIA

Suitable extinguishing media: Water, Carbon dioxide (CO₂), Dry chemical.

Unsuitable extinguishing media - High pressure water jet can spread the fire

5.2 SPECIAL HAZARDS ARISING FROM THE SUBSTANCE OR MIXTURE

Burning produces obnoxious and toxic fumes, carbon monoxide, carbon dioxide.

Powdered material may form explosive dust-air mixtures

5.3 ADVICE FOR FIREFIGHTERS

Wear positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during firefighting operations. If contact is likely, change to full chemical resistant firefighting clothing with self-contained breathing apparatus.

Under fire conditions: Cool containers / tanks with water spray Water mist may be used to cool closed containers Fine dust dispersed in air may ignite. Risks of ignition followed by flame propagation or secondary explosions shall be prevented by avoiding accumulation of dust, e.g. on floors and ledges.

6. ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTIONS

Use personal protective equipment as required

Avoid contact with skin and eyes

Remove all sources of ignition

Sweep up to prevent slipping hazard

Use with recommended personal protective equipment (see Section 8).

6.2 ENVIRONMENTAL PRECAUTIONS

Do not allow material to contaminate groundwater system

Do not flush into surface water or sanitary sewer system

Should not be released into environment

6.3 METHODS AND MATERIAL FOR CONTAINMENT AND CLEANING UP

Avoid dust formation. Sweep up into suitable container for disposal.

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

7. HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING

Avoid contact with skin and eyes

Low hazard for usual industrial or commercial handling

Users should be protected from the possibility of contact with molten material

Recommended for sufficient ventilation at the workplace.

Flammable product

Minimize dust generation and accumulation.

7.2 CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

Store in original container protected from excessive heat, direct sunlight, dust and condensed water.

Protect from moisture, product can be hygroscopic, Store in a cool dry place 5-35 °C.

If you do not need filament for longer period of time, insert it back into container with attached silica gel.

Use within 1 year from manufacture.

Avoid contact with food.

Remove all possible sources of ignition.

7.3 SPECIFIC END USES

Thermoplastic material for FDM 3D-printing

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 APPROPRIATE ENGINEERING CONTROLS:

Avoid contact with skin, eyes and mucous membranes. Avoid prolonged or repeated contact with skin. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking.

8.2 PERSONAL PROTECTION

Eye protection: not required for FDM 3D printing

Skin protection: not required for FDM 3D printing

Respiratory protection: not required for FDM 3D printing

Hand protection: Avoid contact with molten material

Engineering measures: Use recommended printing temperatures to avoid accumulating of decomposition products in workspace and allow air ventilation.

Allow air ventilation to avoid accumulating of dust in the workspace.

Environmental exposure controls: Do not allow product to enter water sources or soil.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid

Appearance: Colored plastic wire

Odor: Odorless

pH: No data available

Melting point: > 220 °C

Boiling point / boiling range: No data available

Vapor pressure: No data available

Vapor density: No data available

Evaporation rate: No data available

Specific gravity: > 1 g/cm³

Decomposition temperature: Thermal stability not tested. Low stability hazard expected at normal operating temperatures.

Autoignition temperature: No data available

Flammability: Fine dust dispersed in air may ignite

Flammability Limits in Air: No information available

Water solubility: negligible

Solubility in other solvents: Not determined

Partition coefficient(n-octanol/water): No data available

Dynamic Viscosity: No data available

Kinematic Viscosity: No data available

Explosive properties: No data available

Oxidizing properties: No data available

10. STABILITY AND REACTIVITY

Reactivity: None expected under conditions of normal use.

Chemical stability: Stable under recommended storage conditions.

Possibility of hazardous reactions: None expected under conditions of normal use.

Conditions to avoid: None at ambient temperatures.

Incompatible materials: Avoid to strong oxidizing agents.

Avoid keeping resin molten for excessive periods of time at elevated temperatures. Prolonged exposure can cause polymer degradation.

Hazardous decomposition products: Burning produces obnoxious and toxic fumes, Carbon monoxide (CO), carbon dioxide (CO₂).

11. TOXICOLOGICAL INFORMATION

11.1 INFORMATION ON LIKELY ROUTES OF EXPOSURE

Inhalation: None known.

Ingestion: None known.

Skin contact: Molten material will produce thermal burns.

Eye contact: Molten material will produce thermal burns.

11.2 INFORMATION ON TOXICOLOGICAL EFFECTS

Acute toxicity

Oral: No data available.

Dermal: No data available.

Inhalation: No data available.

Repeated dose toxicity: No data available.

Skin corrosion/irritation: No data available.

Serious eye damage/eye irritation: No data available.

Respiratory or skin sensitization: No data available.

Mutagenicity: No data available.

Carcinogenicity: No data available.

Reproductive toxicity: No data available.

STOT - single exposure: No data available.

STOT - repeated exposure: No data available.

Aspiration hazards: No data available.

Other adverse effects: No data available.

12. ECOLOGICAL INFORMATION

Acute toxicity

Fish: No data available.

Aquatic invertebrates: No data available.

Chronic toxicity

Fish: No data available.

Aquatic invertebrates: No data available.

Toxicity to aquatic plants: No data available.

Bioaccumulative potential: No data available.

Mobility in soil: No data available.

Results of PBT and vPvB assessment: No data available.

Other adverse effects: No data available.

13. DISPOSAL CONSIDERATIONS

Waste treatment:

Dispose of in accordance with local regulations.
Should not be released into the environment.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Do not dispose as a common household waste.
Sort out as plastic waste.

Packaging:

Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

The substance is not classified as dangerous for transport.

ADR Class not regulated

RID Class not regulated

IMDG Class not regulated

IATA Class not regulated

15. REGULATORY INFORMATION

TSCA (US Toxic Substances Control Act): This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act): This product is listed on the DSL. Any impurities present in this product are exempt from listing.

AICS / NICNAS (Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme): This product is listed on AICS or otherwise complies with NICNAS.

MITI (Japanese Handbook of Existing and New Chemical Substances): This product is listed in the Handbook or has been approved in Japan by new substance notification.

ECL (Korean Toxic Substances Control Act): This product is listed on the Korean inventory or otherwise complies with the Korean Toxic Substances Control Act.

Philippines Inventory (PICCS): This product is listed on the Philippine Inventory or otherwise complies with PICCS.

Inventory of Existing Chemical Substances in China: All components of this product are listed on the Inventory of Existing Chemical Substances in China (IECSC).

16. OTHER INFORMATION

The information presented in this Material Safety Data Sheet (MSDS) is based on our best knowledge in combination with original MSDS provided by manufacturer. MSDS contains information on safety use, storage and disposal.

Abbreviations:

REACH Registration, Evaluation, Authorisation and restriction of chemical substances

EC European Community

PBT Persistent, Bioaccumulating, Toxic

vPvB very Persistent, very Bioaccumulating

PNOC Particulates Not Otherwise Classifiable Occupational Safety and Health Administration (OSHA)

ADR European Agreement concerning the International Carriage of Dangerous Goods by Road

RID International Rule for Transport of Dangerous Substances by Railway

IMDG International Maritime Dangerous Goods Code

IATA International Air Transport Association

DISCLAIMER:

The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above. User should consider this information only as additional. It is the user's responsibility to ensure that he is subject to no other obligations than those mentioned. No liability can be assumed for accuracy and completeness. It is the responsibility of the user to adapt the warnings to local laws and regulations. Safety information describes the product in terms of safety and can not be considered as technical information about the product.

Safety Data Sheet

Material Name: PLA 3D Printer Filament/ MakerBot PLA

SDS ID: MB-002_US

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name

PLA 3D Printer Filament/ MakerBot PLA

Synonyms

Polyactide resin

Chemical Family

polymer, copolymer

Product Use

3D Printing

Restrictions on Use

Do not use in printers where temperatures exceed 250°C.

Details of the supplier of the safety data sheet

MakerBot Industries LLC

One MetroTech Center

Brooklyn, NY 11201

USA

Phone #: MakerBot (347) 334-6800

Emergency Phone #: +1 978 495 5580 –USA multi-lingual response

E-mail: RegulatoryCompliance@makerbot.com

Emergency Poison Control Hot Line : 1 (800) 222-1222

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.

None needed according to classification criteria

GHS Label Elements**Symbol(s)**

None needed according to classification criteria

Signal Word

None needed according to classification criteria

Hazard Statement(s)

None needed according to classification criteria.

Precautionary Statement(s)**Prevention**

None needed according to classification criteria.

Response

None needed according to classification criteria.

Storage

None needed according to classification criteria.

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Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
9051-89-2	1,4-Dioxane-2,5-dione, 3,6-dimethyl-, (3R-cis)-, polymer with (3S-cis)-3,6-dimethyl-1,4-dioxane-2,5-dione and trans-3,6-dimethyl-1,4-dioxane-2,5-dione	>98

Section 4 - FIRST AID MEASURES

Inhalation

Heating may release vapors which may be irritating. In case of inhalation of decomposition products, affected person should be moved into fresh air and kept still. Get medical advice/attention.

Skin

It is unlikely that first aid will be required. IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention.

Eyes

It is unlikely that first aid will be required. Dust may be irritating to the eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention, if needed.

Ingestion

IF SWALLOWED: Rinse mouth. Get immediate medical advice/attention.

Indication of any immediate medical attention and special treatment needed

First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. Treat symptomatically and supportively.

Most Important Symptoms/Effects

Acute

Molten material may cause thermal burns.

Delayed

No information on significant adverse effects.

Note to Physicians

Treat symptomatically. Give artificial respiration if not breathing.

Antidote

None known. Treat symptomatically and supportively.

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Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Water, alcohol resistant foam, regular dry chemical

Unsuitable Extinguishing Media

None known

Special Hazards Arising from the Chemical

Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

Hazardous Combustion Products

Oxides of carbon, aldehydes. May decompose upon heating to produce corrosive and/or toxic fumes.

Fire Fighting Measures

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.

Special Protective Equipment and Precautions for Firefighters

Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

No measures required.

Methods and Materials for Containment and Cleaning Up

Collect spilled material in appropriate container for reuse or disposal. Dispose in accordance with all applicable regulations.

Environmental Precautions

Avoid release to the environment. Comply with all applicable regulations on spill and release reporting. Prevent entry into waterways, sewers, basements, or confined areas.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to the friction of transfer and mixing operations.

Conditions for Safe Storage, Including any Incompatibilities

None needed according to classification criteria.

Store in a cool dry place. Store below 50 C. Avoid heat, flames, sparks and other sources of ignition. Keep away from incompatible materials.

Incompatible Materials

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Oxidizing agents, strong bases

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

1,4-Dioxane-2,5-dione, 3,6-dimethyl-, (3R-cis)-, polymer with (3S-cis)-3,6-dimethyl-1,4-dioxane-2,5-dione and trans-3,6-dimethyl-1,4-dioxane-2,5-dione	9051-89-2
ACGIH:	10 mg/m ³ TWA inhalable particles, recommended; 3 mg/m ³ TWA respirable particles, recommended (related to Particulates not otherwise classified (PNOC))
OSHA (US):	15 mg/m ³ TWA total dust; 5 mg/m ³ TWA respirable fraction (related to Particulates not otherwise classified (PNOC))
	15 mppcf TWA respirable fraction; 5 mg/m ³ TWA respirable fraction; 50 mppcf TWA total dust; 15 mg/m ³ TWA total dust (related to Particulates not otherwise classified (PNOC))

EU - Occupational Exposure (98/24/EC) - Binding Biological Limit Values and Health Surveillance Measures

There are no biological limit values for any of this product's components.

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)

There are no biological limit values for any of this product's components.

Engineering Controls

Provide local exhaust ventilation system. Ventilation should be sufficient to effectively remove and prevent buildup of any dusts or fumes that may be generated during handling or thermal processing.

Individual Protection Measures, such as Personal Protective Equipment

Eye/face protection

None during normal use. Protect against molten solid.

Skin Protection

None during normal use. Protect against molten solid.

Respiratory Protection

No respirator is required under normal conditions of use. If respirable dusts are generated, respiratory protection may be needed.

Glove Recommendations

Protect against molten solid. In the molten form: Wear protective gloves.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

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Appearance	Spool,string,strand	Physical State	solid
Odor	odorless,sweet,plastic	Color	clear,translucent,opaque
Odor Threshold	varies	pH	Not available
Melting Point	150 - 180 °C	Boiling Point	Not available
Freezing point	Not available	Evaporation Rate	Not available
Boiling Point Range	Not available	Flammability (solid, gas)	Not available
Autoignition	388 °C	Flash Point	Not available
Lower Explosive Limit	Not applicable	Decomposition	>250 °C
Upper Explosive Limit	Not applicable	Vapor Pressure	Not available
Vapor Density (air=1)	Not available	Specific Gravity (water=1)	Not available
Water Solubility	Insoluble	Partition coefficient: n-octanol/water	Not available
Viscosity	Not available	Solubility (Other)	Not available
Density	1.25 g/cc	Molecular Weight	Not available

Section 10 - STABILITY AND REACTIVITY

Reactivity

The product is chemically stable under recommended conditions of storage, use and temperature.

Chemical Stability

Stable under normal conditions of use.

Possibility of Hazardous Reactions

Will not polymerize.

Conditions to Avoid

Avoid contact with temperatures above 250 C.

Incompatible Materials

Oxidizing agents, strong bases

Hazardous decomposition products

Oxides of carbon, aldehydes

Thermal decomposition products

May decompose upon heating to produce corrosive and/or toxic fumes.

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Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Inhalation

No hazard is expected from the normal use of this product. Dust may cause irritation of the nose, throat and upper respiratory tract.

Skin Contact

Molten material may cause burns.

Eye Contact

Molten material may cause burns.

Ingestion

No information on significant adverse effects.

Acute and Chronic Toxicity

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

1,4-Dioxane-2,5-dione, 3,6-dimethyl-, (3R-cis)-, polymer with (3S-cis)-3,6-dimethyl-1,4-dioxane-2,5-dione and trans-3,6-dimethyl-1,4-dioxane-2,5-dione (9051-89-2)

Oral LD50 Rat >5000 mg/kg

Dermal LD50 Rabbit >2000 mg/kg

Immediate Effects

Molten material may cause thermal burns.

Delayed Effects

No information on significant adverse effects.

Irritation/Corrosivity Data

No data available.

Respiratory Sensitization

No data available.

Dermal Sensitization

Found to be non-sensitizing when tested on guinea pigs.

Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, NTP, DFG or OSHA

Germ Cell Mutagenicity

Negative in the Ames test for mutagenicity.

Tumorigenic Data

No data available

Reproductive Toxicity

No data available.

Specific Target Organ Toxicity - Single Exposure

No target organs identified.

Specific Target Organ Toxicity - Repeated Exposure

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Material Name: PLA 3D Printer Filament/ MakerBot PLA

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No target organs identified.

Aspiration hazard

No data available.

Medical Conditions Aggravated by Exposure

No data available.

Section 12 - ECOLOGICAL INFORMATION

Component Analysis - Aquatic Toxicity

1,4-Dioxane-2,5-dione, 3,6-dimethyl-, (3R-cis)-, polymer with (3S-cis)-3,6-dimethyl-1,4-dioxane-2,5-dione and trans-3,6-dimethyl-1,4-dioxane-2,5-dione	9051-89-2
Algae:	EC50 72 hr Algae >1100 mg/L

Persistence and Degradability

No information available for the product.

Bioaccumulative Potential

No information available for the product.

Mobility

No information available for the product.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose of contents/container in accordance with local/regional/national/international regulations. Avoid release to the environment. Incineration should be done in accordance with prevailing municipal, state, and federal laws and standards from local environmental agencies.

Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components

Section 14 - TRANSPORT INFORMATION

US DOT Information:

UN#: Not regulated

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations

Safety Data Sheet

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None of this products components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA Section 311/312 (40 CFR 370 Subparts B and C)

Acute Health: No **Chronic Health:** No **Fire:** No **Pressure:** No **Reactivity:** No

U.S. State Regulations

None of this product's components are listed on the state lists from CA, MA, MN, NJ or PA

Not listed under California Proposition 65

Canadian WHMIS Ingredient Disclosure List (IDL)

The components of this product are either not listed on the IDL or are present below the threshold limit listed on the IDL.

Component Analysis - Inventory

1,4-Dioxane-2,5-dione, 3,6-dimethyl-, (3R-cis)-, polymer with (3S-cis)-3,6-dimethyl-1,4-dioxane-2,5-dione and trans-3,6-dimethyl-1,4-dioxane-2,5-dione (9051-89-2)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR - KECL/KECL	KR - TCCA	CN	NZ	MX	TW
Yes	DSL	No	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes

Section 16 - OTHER INFORMATION

NFPA Ratings

Health: 0 Fire: 1 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Summary of Changes

New SDS : 08/26/2015

New SDS : 09/26/2016 Updated phone numbers, email

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH -

Safety Data Sheet

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Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States.

Other Information

Disclaimer:

Supplier gives no warranty whatsoever, including the warranties of merchantability or of fitness for a particular purpose. Any product purchased is sold on the assumption the purchaser shall determine the quality and suitability of the product. Supplier expressly disclaims any and all liability for incidental, consequential or any other damages arising out of the use or misuse of this product. No information provided shall be deemed to be a recommendation to use any product in conflict with any existing patent rights.