

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2008

Version: 1.00

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product Identifiers

Product Code FM-ELC-001-02-001
Product Name SynerG Conductive PLA 3D Printing Filament

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified Uses 3D printing, rapid prototyping, extrusion, injection moulding

1.3 Details of the supplier of the safety data sheet

Company Haydale Limited
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1.4 Emergency telephone number

Emergency # +44 (0)1269 842946

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

H319: Causes serious eye irritation (Category 2)

H335: May cause respiratory irritation (Category 3)

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

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Xi Irritant R36

Xi Irritant R37

For the full text of the R-phrases mentioned in this Section, see Section 16.

2.2 Label elements

Hazard pictograms



Signal words

Warning

Hazard statements

H319: Causes serious eye irritation

H335: May cause respiratory irritation

Precautionary statements

P284: Wear respiratory protection.

P285: In case of inadequate ventilation wear respiratory protection.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P305+351+338: If in eyes: rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P301+330+331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

2.3. Other Hazards

Ultrafine dust may cause irritation of the eyes and respiratory system. Electrostatic discharges may be generated from dry material during handling. CAUTION: this form of carbon has not yet been fully tested regarding health, safety and environmental effects.

PBT identification This substance is not identified as a PBT substance.

SECTION 3: Composition and information on ingredients

3.1. Substances

Substance/Mixture: Mixture

Chemical Name	Registration No.	CAS No.	EC No.	Concentration
Poly lactide resin	N/A	9051-89-2	618-575-7	>98%
Graphite in the form of graphene	N/A	7782-42-5	231-955-3	1-10%
Carbon Nanotubes (MWCNTs)	N/A	N/A	936-414-1	1-10%

Chemical Characterization

Synonyms Graphene enhanced polymer, polymer filament.
Formula N/A
Molecular Weight N/A

No further components need to be disclosed according to the applicable regulations.

3.1.1 Additional information:

Full text of R-, H- and EUH-phrases: see section 16.

This material can generate Particulates Not Otherwise Classifiable (PNOC). The Occupational Safety and Health Administration (OSHA) PEL/TWA for PNOC is 15 mg/m³ for total dust and 5 mg/m³ for the respirable fraction. The American Conference of Governmental Industrial Hygienists (ACGIH) TLV/TWA for PNOC is 10 mg/m³ for inhalable particulates and 3 mg/m³ for respirable particulates.

SECTION 4: First aid measures

4.1. Description of first aid measures

Following inhalation If safe to do so remove casualty from exposure, ensuring one's own safety whilst doing so. Move to fresh air. Consult a doctor.

Following skin contact Adverse effects are not expected from accidental skin contact of non-molten material following occupational exposure. Remove contaminated clothing immediately unless stuck to skin. Wash off promptly and flush contaminated skin with soap and water. Do not attempt to remove hot polymer from skin. Cool skin rapidly with cold water after contact with hot polymer. Consult a doctor immediately.

Following eye contact Make sure to remove any contact lenses from the eyes before rinsing. Promptly wash eyes with plenty of water while lifting the eye lids for at least 15 minutes. Get medical attention promptly if symptoms occur after washing. Consult a doctor immediately.

Following Ingestion Immediately rinse mouth and drink plenty of water. Do not give anything by mouth to an unconscious person. Keep person under observation. Do not induce vomiting. If vomiting occurs, keep head low. Seek medical attention if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Inhalation There may be irritation of the throat with a feeling of tightness in the chest. Exposure may cause coughing or wheezing.
Skin contact There may be irritation and redness at the site of contact.
Eye contact There may be irritation and redness. The eyes may water profusely.

Ingestion There may be soreness and redness of the mouth and throat.

4.3 Indication of any immediate medical attention and special treatment needed

If any irritation occurs, seek medical advice/attention.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents: Carbon dioxide, extinguishing foam and powder, water mist. Alcohol resistant foams are preferred if available. General purpose foams (including AFFF) or protein foams may function, but much less effectively.

5.2 Special hazards arising from the substance

In combustion, emits toxic fumes, carbon monoxide, and carbon dioxide.

5.3 Advice for firefighters

Wear self-contained breathing apparatus, pressurised mask, MSHA/NIOSH, and full protective gear. Wear protective clothing to prevent contact with skin and eyes. Keep run-off water out of sewers and water sources. Cool containers/tanks with spray water.

SECTION 6: Accidental release measures

6.1. Personal precautions

6.1.1 For non-emergency personnel

Avoid generation and spreading of dust
Use personal protective equipment, see section 8
Provide adequate ventilation
Remove all sources of ignition.
Sweep up dropped material to prevent slipping hazard.
Avoid contact with skin and eyes.
Avoid dust formation.

6.1.2 For emergency personnel

Wear an appropriate NIOSH/MSHA approved respirator if dust is generated.

6.2. Environmental precautions

Do not flush into drains or rivers. Prevent further spillage if safe. Advise local authorities if large spills cannot be contained.

6.3. Clean-up procedures

Clean-up should be dealt with only by qualified personnel familiar with the specific substance. Transfer to a closable, labeled salvage container for disposal by an appropriate method. Under some circumstances additional, more robust PPE is required when dealing with serious spills. Keep combustibles away from spilled material. Extinguish all ignition sources. Avoid sparks, flames, heat and smoking. Ventilate. Absorb in vermiculite, dry sand or earth and place into containers. Wash thoroughly after dealing with a spillage. Scoop into marked containers for disposal as chemical waste.

6.4. Reference to other sections

Refer to section 8 of SDS for personal protection details.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid contact with skin and eyes.
Ensure there is sufficient ventilation of the area.
Use PPE as required.
Keep away from heat, sparks, and open flame.
Avoid dust formation.
Workers should be protected from possibility of contact with molten material.
Low hazard for handling material when not heated.

7.2. Conditions for safe storage, including any incompatibilities

Store in cool, well-ventilated area. Keep at temperatures below 50°C (122°F).

7.3. Specific end use(s)

See section 1.2, no other specific uses are stipulated.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Product/ingredient name	Type	Compartment Detail	Value	Method Detail
Graphite (7782-42-5)	WEL	Inhalable dust	10 mg/m ³	Long term (UK)
	WEL	Respirable dust	4 mg/m ³	Long term (UK)
	DNEL	Inhalational	1.2 mg/m ³	Industry, long term, local effects
	DNEL	Inhalational	0.3 mg/m ³	Consumer, long term, local effects
	DNEL	Oral (bw/day)	813 mg/m ³	Consumer, long term, systemic effects
Carbon Nanotubes (MWCNTs)	DNEL	Not known	0.05 mg/m ³	No official Occupational Exposure Limit has yet been established

8.2 Exposure controls

Process conditions	Provide eyewash station.
Engineering measures	Handle in accordance with good industrial hygiene and safety practice. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded where dust may be generated.
Respiratory equipment	Provide adequate ventilation when dusts are generated. Where dust is a hazard, wear mask supplied with: Gas cartridge suitable for organic substances, dust filter.
Hand protection	For prolonged or repeated skin contact use suitable protective gloves. Use protective gloves made of: Neoprene, Nitrile, Rubber (natural, latex).
Eye protection	Wear safety glasses with side-shields or eye goggles.
Other Protection	Wear appropriate clothing to prevent any possibility of skin contact. Wear suitable clothing to prevent exposure to heat.
Hygiene measures	Wash hands at the end of each work shift and before eating, smoking and using the toilet. Promptly remove any clothing that becomes contaminated. Use appropriate skin cream to prevent drying of skin. When using do not eat, drink or smoke.
Special hazard:	Workers should be protected from the possibility of contact with molten material during fabrication

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties**General Information****Appearance**

Physical State	Opaque filament
Colour	Dark grey
Odour	No characteristic odour

Important health, safety and environmental information

pH	No data available
Melting point/Freezing Point	155°C to 160°C
Initial boiling point and boiling range	No data available

Flash point	No data available
Evaporation rate	No data available
Flammability (solid, gas)	Fine dust dispersed in air may ignite.
Upper/lower flammability or explosive limits	No data available
Vapour pressure	No data available
Vapour density	No data available
Relative density	1.25
Water solubility	Insoluble in water
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	388°C
Decomposition temperature	250°C
Viscosity	No data available
Explosive properties	No data available
Oxidizing properties	No data available

9.2 Other information
No additional information

SECTION 10: Stability and reactivity

10.1 Reactivity

Stable under normal and anticipated storage and handling conditions.

10.2 Chemical Stability

Stable at room temperature in closed containers under normal and anticipated storage and handling conditions.

10.3 Possibility of hazardous reactions

Stable under normal and anticipated storage and handling conditions.

10.4 Conditions to avoid

Heat, sparks and open flames. Dust generation. Temperatures above 230°C. Avoid keeping resin molten for excessive periods of time at elevated temperatures. Prolonged exposure will cause polymer degradation.

10.5 Incompatible materials

Acids, alkali metals, oxidising agents, alkalis, halogens, strong bases

10.6 Hazardous decomposition products

In combustion emits toxic fumes, aldehydes, carbon monoxide (CO), carbon dioxide CO₂

SECTION 11: Toxicological information

11.1 Information on toxicological effects

General information	Prolonged and repeated contact with solvents over a long period may lead to permanent health problems. Burning produces irritant fumes
Inhalation	May cause respiratory irritation. Inhalation of dust may cause shortness of breath, tightness of the chest, a sore throat and cough.
Ingestion	No known significant effects or critical hazards Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea
Skin contact	May cause irritation. May cause skin irritation and/or dermatitis
Eye contact	May cause irritation.

11.2. Acute Toxicity Data

Product/ingredient name	Test	Species	Route	Result
Graphite (7782-42-5)	LD50 Oral	Rat		>2000 mg/kg
	LC50 Inhalation	Rat	4 hrs	2000 mg/m ³
	OECD 404 Acute Dermal Irritation/ Corrosion	Rabbit	Skin	No Skin irritation
	OECD 405 Acute Eye Irritation/ Corrosion	Rabbit	Eyes	No eye irritation
Polylactide resin (9051-89-2)	LD50 Oral	Rat		>5000 mg/kg
	LD50 Dermal	Rabbit		>2000 mg/kg
Carbon Nanotubes (MWCNTs)	LD50 Oral	Rat		>5000 mg/kg
	LD50 Dermal	Rat		>2000 mg/m ³

Additional information

Product/ingredient name	Test
Polylactide resin (9051-89-2)	This product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.
	There were no target organ effects noted following ingestion or dermal exposure in animal studies.
	Did not cause skin allergic reactions in skin sensitisation studies using guinea pigs.
Carbon Nanotubes (MWCNTs)	Inhalation, repeated dose, 5 days, rat, LOAEC: 2 mg/m ³
	Inhalation, repeated dose, 90 days, rat, LOAEC: 0.1 mg/m ³
	Target organ: lung (multifocal granulomatous inflammation)
	Oral, repeated dose, 28 days, rat, NOAEL: 0.5 mg/kg
	No carcinogenic response. (2-year bioassay in the peritoneal cavity of the rat)

SECTION 12: Ecological information

12.1 Eco-Toxicity

Product/ingredient name	Test (Species)	Value	Comment
Graphite (7782-42-5)	LC50 (fish)	100 mg/l	96 hr
	NOEC (fish)	100 mg/l	4 days
	EC50 (aquatic invertebrates)	100 mg/l	48 hrs
	EC50 (aquatic algae)	100 mg/l	72 hrs
	EC50 (aquatic invertebrates)	100 mg/l	48 hr
	EC50 (aquatic algae)	134 mg/l	72 hr
Polylactide resin (9051-89-2)	EC50 (aquatic algae)	1100 mg/l	72 hr
Carbon Nanotubes (MWCNTs)	EC50 (fish)	100 mg/l	14 days
	EC50 (aquatic invertebrates)	100 mg/l	48 hrs
	EC50 (aquatic algae)	134 mg/l	72 hrs

12.2 Persistence and degradability

No data available.

12.3 Bioaccumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

This substance is not identified as a PBT substance.

12.6 Other adverse effects

No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods**Product**

Dispose of this product and all contaminated materials in compliance with all local and national regulations. Cannot be recycled. Do not contaminate ponds, waterways or ditches with chemical or used container.

Contaminated packaging

If empty container retains product residues, all label precautions must be observed. Dispose in compliance with all local and national regulations.

13.2 Additional information

None

SECTION 14: Transport Information

General

This material is not covered by international regulations on the transport of dangerous goods (IMDG, IATA, ADR/RID)

14.1 UN Number

ADR/RID: Information not available IMDG: Information not available IATA: Information not available

14.2 UN proper shipping name

ADR/RID: Information not available
IMDG: Information not available
IATA: Information not available

14.3 Transport hazard class(es)

ADR/RID: Information not available IMDG: Information not available IATA: Information not available

14.4 Packing group

ADR/RID: Information not available IMDG: Information not available IATA: Information not available

14.5 Environmental hazards

ADR/RID: Information not available IMDG: Information not available IATA: Information not available

14.6 Special precautions for user

No data available

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not regulated

SECTION 15: Regulatory Information

EU Legislation

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC, including amendments.

SECTION 16: Other information

Indication of changes

Revision Number 1.00
Revision Date 15/04/2021
Supersedes Revision N/A

Abbreviations and acronyms

None

Relevant R-, H- and EUH-phrases (number and full text)

H319: Causes serious eye irritation
H335: May cause respiratory irritation
P284: Wear respiratory protection.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P285: In case of inadequate ventilation wear respiratory protection.
P305+351+338: If in eyes: rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P301+330+331: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
Xi Irritant R36/37: Irritating to eyes and respiratory system

Further information

Further information on this product can be found on the Haydale website

The content supplied in this safety data sheet (“Information”) supersedes all previous versions supplied

The Information is designed only as guidance for the safe handling, storage, processing and/or use of the **Product**. The Information is correct to the best of the Haydale Group’s knowledge and belief at the date of publication (**Haydale Group** means **Haydale Limited** as a subsidiary of **Haydale Graphene Industries plc.** and any subsidiary or holding company from time to time and any subsidiary from time to time of any holding company of Haydale Limited), however no express or implied warranty or guarantee or representation is made regarding the fitness for any particular purpose, merchantability, accuracy or completeness of the Information provided. The Information relates solely to the specific Product designated and may not be valid or applicable where the Product is handled, stored, processed or used in combination with any other materials or in any process other than those described in the Information.