1. PRODUCT AND SUPPLIER INFORMATION

Trade name : PEN 3D printing filament: KN-R16

Chemical name : Polyethylene naphthalate

Recommended use : Fused deposition modeling (FDM) 3D printing filament

Supplier : FLXR Engineering. Co., Ltd.
1F & 2F, #11-1 Wuquan 1st Rd
Xinzhuang Dist., New Taipe City, Taiwan 24892

In case of toxicological emergency, contact your doctor first

Emergency phone number: +886-2-2290-1122

Contact person (E-mail): Kurt Chiang, PhD (hello@flxr.engineering)

2. HAZARDS IDENTIFICATION

OSHA/HCS status : in its solid form Polyethylene Naphthalate (PEN) not classified as hazardous under CLP Regulation (EC) No. 1272/2008 or GHS.

Polyethylene Naphthalate (PEN)	
Classification of the substance	Not classified as a dangerous product
Hazard statement	N/A
Signal word	N/A
Precautionary statement	
Prevention	N/A
Response	N/A
Storage	N/A
Disposal	N/A
Supplemental label	N/A
Hazards not otherwise classified	Molten material will produce thermal burns

3. COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS No.	Concentration Range (%)
Poly (ethylene 2,6-naphthalenedicarboxylate)	25853-85-4	100

Any concentration shown as range is to protect confidentiality or due to batch variation.

There are no additional ingredients present which, within the current knowledge of supplier and in the concentrations applicable, are classified and hence require reporting in this section.

4. EMERGENCY FIRST AID

Eye contact	Not likely due to nature of product. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
Inhalation	Not likely due to nature of product. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention if adverse health effects persist or are severe. Maintain an open airway. Loosen tight clothing such as collar, tie, belt or waistband.
Skin contact	Flush contaminated skin with plenty of water. For hot or molten polymer, immediately immerse and/or flush area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.
Ingestion	Not likely due to nature of product. If ingested, wash mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting maybe dangerous. Never give anything by mouth to an unconscious person. Get medical attention if adverse health effects persist of are severe.
Note to physician	Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. Heated material can cause thermal burns.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media	Use dry chemical powder, CO_2, use water spray, or foam
Unsuitable extinguishing media	Not known
Specific hazard arising from the chemical	No specific hazard
Hazardous thermal decomposition products	○ carbon dioxide ○ carbon monoxide ○ hydrocarbon ○ acetaldehyde
Special protective actions for fire-fighter	Wear self-contained breathing apparatus for firefighting if necessary. Use personal protective equipment.
Special equipment for fire-fighters	Fire-fighter should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas.
Environmental precautions	Do not let product enter drains, waterways, sewers and soil.
Methods and materials for containment and cleaning up	Allow to solidify molten material. Clean up by vacuuming or sweeping the cut off material. Dispose of waste and residue according to local regulations
Reference to other sections	For disposal see section 13.

7. HANDLING AND STORAGE

Precautions for safe handling	Ensure good ventilation at the work area. Put on appropriate personal equipment (see section 8). Do not ingest. Keep normal measures for fire prevention. Keep in the original container or an approved alternative made from a compatible material, kept tightly sealed when not in use. Avoid contact with molten material; do not breathe fumes, vapors, dust or sprays from molten or burning material. Heated material can cause thermal burns.
Hygiene measures	Eating, drinking and smoking should be prohibited in areas where this material is handled stored and processed. See also section 8 for additional information on hygiene measures.
Conditions for safe storage, including any incompatibilities	Product should be stored in a dry and cool place at temperatures between >0 to 40 °C. Avoid direct sunlight. Minimize moisture uptake by leaving it in a sealed package together with the supplied desiccant.
Specific end use(s)	Filament for 3D printing.

8. EXPOSURE AND PROTECTION INFORMATION

Respiratory Protection	No special requirements needed.
Protection Gloves	No special requirements needed.
Eye Protection	Safety glasses with side shields are recommended.
Other	No protective equipment is needed under normal use conditions.

9. PHYSICAL/CHEMICAL DATA

Physical state	Solid	Relative density	>1
Color	Transparent/opaque	Density	1.31 g/cm^3
Odor	Slight to odorless	Solubility	Insoluble in the cold water and hot water
Odor threshold	Not available	Miscible with water	No
pH	Not available	Partition coefficient: n-octanol/water	Not applicable
Melting point	>255˚C (491˚F)	Auto-ignition temperature	Not applicable
Boiling point	Not available	Decomposition temperature	Not available
Flash point	Not applicable	SADT	Not available
Evaporation rate	Not available	Viscosity	Not applicable
Flammability	Not available	Flow time (ISO 2431)	Not available
Lower & upper explosion limit/ flammability limit	Not applicable	Particle characteristics (median particle size)	Not available
Vapor pressure	Not available	Additional information (physical/chemical properties comments)	No additional information
Relative vapor density	Not applicable		

10. STABILITY AND REACTIVITY

Reactivity	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal condition of storage and use, hazardous reaction will not occur.
Condition to avoid	Avoid the creation of dust when handling and avoid all possible source of ignition (spark or flame). Take precautionary measures against electrostatic discharges.
Incompatible materials	Reactive or incompatible with oxidizing materials.
Hazardous decomposition products	Under normal condition of storage and use, hazardous decomposition products should not be produced. Molten polymer or prolonged air drying of polymer at temperature above 195˚C will release small quantities of acetaldehyde (CAS#75-07-0).

11. TOXICOLOGICAL INFORMATION

Ingestion	No known significant effect or critical hazards.
Eye contact	No known significant effect or critical hazards.
Inhalation	No known significant effect or critical hazards.
Skin contact	No specific data

Delayed and immediate effect and also chronic effects from short- and long-term exposure:

Short term exposure	Not available
Long term exposure	Not available

Potential chronic health effects:

General	No known significant effect or critical hazards.
Carcinogenicity	No known significant effect or critical hazards.
Mutagenicity	No known significant effect or critical hazards.
Reproduction toxicity	No known significant effect or critical hazards.

12. ECOLOGICAL INFORMATION

Toxicity	Not available
Persistence & degradability	Not available
Bio-accumulative potential	Not available
Mobility in soil	Not available
Other adverse effects	No known significant or critical hazards.

13. DISPOSAL CONSIDERATIONS

Disposal methods

Recycled as much as possible with PET, or consult with a professional. The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration and landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Avoid dispersal of grinded material to be in contact with soil, waterways, drains and sewers.

14. TRANSPORT INFORMATION

	DOT classification	IMDG	IATA
UN number	Not regulated	Not regulated	Not regulated
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.

15. REGULATORY INFORMATION

U.S. Federal regulations	TSCA 8(a) CDR exempt/Partial exemption: All components are listed or exempted
Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)	Not listed
Clean Air Act Section 602 Class I Substances	Not listed
Clean Air Act Section 602 Class II Substances	Not listed
DEA List I Chemicals (Precursor Chemicals)	Not listed
DEA List II Chemicals (Essential Chemicals)	Not listed
SARA 302/304 Composition/information or ingredients	No products were found
SARA 304 RQ	Not applicable
SARA 311/312 Classification	Combustible dusts
Composition/information on ingredients	No products were found
SARA 313	Not applicable
USA regulations	None of the components are listed

Massachusetts	None of the components are listed
New York	None of the components are listed
New Jersey	None of the components are listed
Pennsylvania	None of the components are listed
California Prop.65	This product does not require a Safe Harbor warning under California Prop.65
International regulations	Not listed
Chemical weapon convention list schedule I, II & III Chemical	
Montreal Protocol	Not listed
Stockholm Convention on Persisted Organic Pollutants	Not listed
Rotterdam Convention on Prior Informed Consent (PIC)	Not listed
UNECE Aarhus Protocol on POPS and Heavy Metals	Not listed

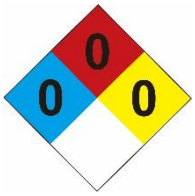
16. OTHER INFORMATION

Health	0
Flammability	0
Physical hazards	0

Caution: HMIS® rating are based on a 0-4 rating scale, with 0 representing minimal hazards or risk, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is registered trademark and service mark of the American Coating Association, Inc.
The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the MMS® Implementation manual.

National Fire Protection Association (U.S.A)

Health



Flammability
Instability/Reactivity
Special hazards

History

Date of issue/Date of revision : 2024/10/14

Prepared by : FLXR Engineering Co., Ltd.

Key to abbreviation

GHS	Global Harmonized System of Classification and Labelling of Chemicals
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
N/A	Not available
UN	United Nations

References : HCS (U.S.A)- Hazard Communication Standard

International transport regulations

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.