SAFETY DATA SHEET
In accordance with 29 CFR 1910.1200:2012, ANSI Z400.1-2010, and ISO 11014-1: 2009.

SECTION 1: Product and Company Identification

Product Name:
TPU/Flexible 3D Printer Monofilament.

Chemical name:
Aromatic Polyether-Based Thermoplastic Polyurethane (TPU).

Product Use:
3D Printing

Supplier:
Nicieza y Taverna Hnos. S.A.I.C.y A., 6620, Chivilcoy, Buenos Aires , Argentina.

Emergency telephone numbers (24 hours a day):
Centro Nacional de Intoxicaciones (Argentina) 0-800-333-0160

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
This product does not meet the classification requirements of the current European legislation.

Classification according to Regulation (EC) No 1272/2008 as amended.
Not classified

2.2 Label elements according to Regulation (EC) No 1272/2008 as amended
not applicable.

2.3 **Other hazards:**None identified

SECTION 3: Composition/information on ingredients

3.2 Mixtures
Regulation No. 1272/2008.
This material has no known hazards under applicable laws.
See Section 15 for Regulation (EC) No. 1907/2006 REACH Article 59(1).

SECTION 4: First aid measures

Candidate List (Substances of Very High Concern (SVHC))

4.1 Description of first aid measures

Inhalation: Remove exposed person to fresh air if adverse effects are observed.

Eye contact: Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. If hot melted material should
splash into the eyes, flush eyes immediately with water for 15 minutes while holding the eyelids open. Immediately call a poison center or doctor.

Skin Contact: Wash with soap and water. If skin irritation occurs, get medical attention. For contact with molten product, do not remove contaminated clothing. Flush skin immediately with large amounts of cold water. If possible submerge area in cold water. Pack with ice. DO NOT attempt to peel polymer from skin. Seek medical attention immediately.

Ingestion: No specific first aid measures noted.

Personal Protection for First-aid Responders: When providing first aid always protect yourself against exposure to chemicals or blood born diseases by wearing gloves, masks and eye
protection. After providing first aid wash your exposed skin with soap and water.

4.2 Most important symptoms
and effects, both acute and delayed: See section 11.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: No data available.

Treatment: Treat symptomatically.

SECTION 5: Firefighting measures

General Fire Hazards: No unusual fire or explosion hazards noted.

5.1 Extinguishing media

Suitable extinguishing media: Use water spray, dry chemical or foam for extinction. CO2 may be ineffective on large fires.

Unsuitable extinguishing media: Not determined.

5.2 Special hazards arising from the substance or mixture: See section 10 for additional information.

5.3 Advice for firefighters

Special fire fighting procedures: Thermoplastic polymers can burn. Protect product from flames; maintain proper clearance when using heat devices, etc. Irritating or toxic substances will be emitted upon burning, combustion or decomposition. Large masses of molten polymer held at elevated temperatures for extended periods of time may auto-ignite.

Special protective equipment for fire-fighters: Wear full protective firegear including self-containing breathing apparatus operated in the positive pressure mode with full facepiece, coat, pants, gloves and boots.

SECTION 6: Accidental release measures

6.1 Personal precautions,
protective equipment and emergency procedures: No data available.

6.2 Environmental Precautions: Avoid release to the environment. Do not contaminate water sources or sewer. Environmental manager must be informed of all major spillages.
Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up: Pick up free solid for recycle and/or disposal.

6.4 Reference to other sections: See sections 8 and 13 for additional information.

SECTION 7: Handling and storage:

.1

Precautions for safe handling: Provide adequate ventilation. Observe good industrial hygiene practices.
Wear appropriate personal protective equipment.

Contact with heated material may cause thermal burns. Wash thoroughly after handling.

Refer to Processing Guide and/or contact your local Technical Service representative for melt processing temperature range. For most thermoplastic polyurethanes, melt processing is in the range of 177 - 232 deg. C (350 - 450 deg. F), however, some products may process at different temperatures. Heating above the maximum handling temperature can generate hazardous decomposition products (see Section 10). Review the temperature data in the "Maximum Handling Temperature" included in this section for processing temperature not to be exceeded.

Fume condensates may include hazardous contaminants from additives. Condensate may be combustible and should be periodically removed from exhaust hoods, ductwork, and other surfaces. Impervious gloves should be worn during cleanup operations to prevent skin contact.

Post thermal processing activities necessary to produce molded articles (such as cutting, sanding, sawing, grinding, drilling, or regrinding) may create dust or "fines." Powders, dust, and/or fines may pose a dust explosion hazard. Avoid breathing dust.

Loading and unloading operations may cause nuisance dust to form. Electrostatic buildup may occur when pouring or transferring this product from its container. The spark produced may be sufficient to ignite vapors of flammable liquids. Always transfer product by means which avoid static buildup. Avoid pouring product directly from its container into combustible or flammable solvent.

Conduct any operations emitting fumes or vapors (including thermo-forming, heat joining, cutting and or sealing of articles and clean up) under well-ventilated conditions. Avoid breathing process vapors. Do not hold product for extended periods of time at elevated temperatures or allow thick masses of hot polymer to accumulate because they can decompose emitting hazardous gasses. Do not taste, swallow, or chew products. Wash thoroughly after processing. Do not store or consume food in processing areas. The major off-gasses from normal melt processing are expected to be water vapor and carbon dioxide. Other trace volatile organic components may also be emitted.

Do not steam sterilize articles made with thermoplastic polyurethanes. Methylene dianiline can be generated as a result.

Maximum Handling
Temperature: 221 °C

7.2 Conditions for safe storage, including any incompatibilities:
Store away from incompatible materials. See section 10 for incompatible
materials. Store in dry, well ventilated place away from sources of heat and direct sunlight.

Maximum Storage
Temperature: Not determined.

7.3 Specific end use(s): End uses are listed in an attached exposure scenario when one is required.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters Occupational Exposure Limits
None of the components have assigned exposure limits.

8.2 Exposure controls

Appropriate engineering controls: Thermal processing operations should be ventilated to control gases and
fumes given off during processing.

Individual protection measures, such as personal protective equipment

General information: Please follow the recommended personal protective equipment (PPE) guidelines below and refer to the appropriate EN standard where
applicable. Use personal protective equipment as required.

Eye/face protection: If contact is likely, safety glasses with side shields are recommended. Eye protection should meet the standards set out in EN 166.

Skin protection
Hand Protection: To avoid burns from contact with molten product, use thermal insulating gloves. Suitable gloves can be recommended by the glove supplier.

General: Because specific work environments and material handling practices vary, safety procedures should be specific for each intended application. The correct choice of protective gloves depends upon the chemicals being handled, and the conditions of work and use. Most gloves provide protection for only a limited time before they must be discarded and replaced (even the best chemically resistant gloves will break down after repeated chemical exposures). Gloves should be chosen in consultation with the supplier / manufacturer and taking account of a full assessment of the working conditions. For typical use and handling of chemical substances, gloves should meet the standards set out in EN 374. For applications involving mechanical risks with potential for abrasion or puncture, the standards set out in EN 388 should be considered. For tasks involving thermal hazards, the standards set out in EN 407 should be considered.

Break-through time: Breakthrough time data are generated by glove manufacturers under laboratory test conditions and represent how long a glove can be expected to provide effective permeation resistance. It is important when following breakthrough time recommendations that actual workplace conditions are taken into account. Always consult with your glove supplier for up-to-date technical information on breakthrough times for the recommended glove type.
For continuous contact, we suggest gloves with a minimum breakthrough time of 240 minutes, or > 480 minutes if suitable gloves can be obtained. If suitable gloves are not available to offer that level of protection, gloves with shorter breakthrough times may be acceptable as long as appropriate glove maintenance and replacement regimes are determined and adhered to.
For short-term, transient exposures and splash protection, gloves with shorter breakthrough times may commonly be used. Therefore, appropriate maintenance and replacement regimes must be determined and rigorously followed.
Glove thickness: For general applications, we recommend gloves with a thickness typically greater than 0.35 mm.
It is important to note that glove thickness is not the only predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material.
Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.
Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task.
Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example: Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, before being disposed of. Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential.
Other: Long sleeve shirt is recommended.

Respiratory Protection: Consult with an industrial hygienist to determine the appropriate respiratory protection for your specific use of this material. A respiratory protection program compliant with all

applicable regulations must be followed whenever workplace conditions require the use of a respirator. Under normal use conditions, respirator is not usually required. Use appropriate respiratory protection if exposure to dust particles, mist or vapors is likely. Cutting operations may create small particles from this product. If inhalation of particles cannot be avoided, wear a dust respirator.

Respiratory Protective Equipment (RPE) is not normally required where there is adequate natural or local exhaust ventilation to control exposure. In case of insufficient ventilation, wear suitable respiratory equipment.

The correct choice of respiratory protection depends upon the chemicals being handled, the conditions of work and use, and the condition of the respiratory equipment.

Safety procedures should be developed for each intended application. Respiratory protection equipment should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Please refer to the relevant EN standards for the RPE selected.

Hygiene measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated
footwear that cannot be cleaned.

Environmental Controls: No data available.
See section 6 for details.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties Appearance
Physical state: solid
Form: Pellets
Color: Natural
Odor: Faint
Odor Threshold: No data available.
pH: No data available.
Melting Point: No data available.
Boiling Point: No data available.
Flash Point: Not applicable.
Evaporation Rate: No data available.

Flammability (solid, gas): No data available.
Upper/lower limit on flammability or explosive limits
Flammability Limit - Upper (%): No data available.
Flammability Limit - Lower (%): No data available.
Vapor pressure: No data available.
Vapor density (air=1): No data available.
Relative density: 1 - 1.1 (20 °C)
Solubility(ies)
Solubility in Water: Insoluble in water
Solubility (other): No data available.
Partition coefficient (n-octanol/water): No data available.
Autoignition Temperature: No data available.
Decomposition Temperature: No data available.
Viscosity: No data available.
Explosive properties: No data available.
Oxidizing properties: No data available.
VOC Content: No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity: No data available.

10.2 Chemical Stability: Material is stable under normal conditions.

10.3 Possibility of hazardous reactions: Will not occur.

10.4 Conditions to avoid: None known.

10.5 Incompatible Materials: None known, avoid contact with reactive chemicals.

10.6 Hazardous Decomposition Products: Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors. Nitrogen Oxides May also include isocyanates and small amounts of hydrogen cyanide.

SECTION 11: Toxicological information

Information on likely routes of exposure

Inhalation:No data available.

Ingestion:No data available.

Skin Contact:No data available.

Eye contact:No data available.

11.1 Information on toxicological effects Acute toxicity
Oral
Product: Not classified for acute toxicity based on available data.
Dermal
Product: Not classified for acute toxicity based on available data.
Inhalation
Product: Not classified for acute toxicity based on available data.

Skin Corrosion/Irritation:No data available
Serious Eye Damage/Eye Irritation:No data available

Respiratory sensitization:No data available
Skin sensitization:No data available
Specific Target Organ Toxicity - Single Exposure:No data available
Aspiration Hazard:No data available
Chronic Effects Carcinogenicity:No data available
Germ Cell Mutagenicity:No data available
Reproductive toxicity:No data available
Specific Target Organ Toxicity - Repeated Exposure:No data available

SECTION 12: Ecological information

12.1 Ecotoxicity
Fish
No data available

Aquatic Invertebrates
No data available

Toxicity to Aquatic Plants
No data available

Toxicity to soil dwelling organisms
No data available

Sediment Toxicity
No data available

Toxicity to Terrestrial Plants
No data available

Toxicity to Above-Ground Organisms
No data available

Toxicity to microorganisms
No data available

12.2 Persistence and Degradability Biodegradation
No data available

BOD/COD Ratio

12.3 Bioaccumulative Potential Bioconcentration Factor (BCF)
No data available

Partition Coefficient n-octanol / water (log Kow)
No data available

12.4 Mobility:
No data available

12.5 Results of PBT and vPvB assessment:
No data available

12.6 Other Adverse Effects:
No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Disposal methods: Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.
Since emptied containers retain product residue, follow label warnings even after container is emptied.

Contaminated Packaging: Container packaging may exhibit hazards.

SECTION 14: Transport information

ADR
Not regulated.

IMDG
Not regulated.

IATA
Not regulated.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
None known.

Shipping descriptions may vary based on mode of transport, quantities, temperature of the material, package size, and/or origin and destination. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material. For transportation, steps must be taken to prevent load shifting or materials falling, and all relating legal statutes should be obeyed. Review classification requirements before shipping materials at elevated temperatures.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture: EU Regulations
Regulation (EC) No. 2037/2000 Substances that deplete the ozone layer:
None present or none present in regulated quantities.
Regulation (EC) No. 850/2004 on persistent organic pollutants:
None present or none present in regulated quantities.

Regulation (EC) No. 689/2008 Import and export of dangerous chemicals:
None present or none present in regulated quantities.
Regulation (EC) No. 1907/2006, REACH Article 59(1). Candidate List:

Chemical name	EC No.	Concentration
2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol	247-384-8	0.1 - 1.0%

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended:
None present or none present in regulated quantities.
Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:
None present or none present in regulated quantities.
Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work.:
None present or none present in regulated quantities.
Directive 92/85/EEC: on the safety and health of pregnant workers and

workers who have recently given birth or are breast feeding.:
None present or none present in regulated quantities.
Directive 96/82/EC (Seveso II): on the control of major accident hazards involving dangerous substances:
None present or none present in regulated quantities.
EU. Regulation No. 166/2006 PRTR (Pollutant Release and Transfer Registry), Annex II: Pollutants:
None present or none present in regulated quantities.
Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work:
None present or none present in regulated quantities.
Inventory Status
Australia (AICS)
All components are in compliance with chemical notification requirements in Australia.
Canada (DSL/NDSL)
All components are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List.
China (IECSC)
All components of this product are listed on the Inventory of Existing Chemical Substances in China.
European Union (REACh)
To obtain information on the REACH compliance status of this product, please e-mail REACH@SDSInquiries.com.
Japan (ENCS)
All components are in compliance with the Chemical Substances Control Law of Japan.
Korea (ECL)
All components are in compliance in Korea.
New Zealand (NZIoC)
All components are in compliance with chemical notification requirements in New Zealand.
Philippines (PICCS)
All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).
Switzerland (SWISS)
All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland.
Taiwan (TCSCA)
This product requires notification before sale in Taiwan.
United States (TSCA)
All components of this material are on the US TSCA Inventory.

The information that was used to confirm the compliance status of this product may deviate from the chemical information shown in Section 3.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

SECTION 16: Other Information

Key literature references and sources for data: Internal company data and other publically available resources.

Wording of the H-statements in section 2 and 3: none

Abbreviations and acronyms:
ACGIH – American Conference of Governmental Industrial Hygienist ADR – International Carriage of Dangerous Goods by Road
AICS - Australian Inventory of Chemical Substances ATEmix - Acute Toxicity Estimate for the mixture BCF - Bio concentration factor
DMSO - Dimethyl sulfoxide DSL - Domestic Substance List
EC50 - Effective concentration that gives a response in 50% of the population ECHA - European Chemical Agency
ECL - Existing Chemical List
ENCS - Existing and New Chemical Substances EPA – Environmental Protection Agency
IARC - International Agency for Research on Cancer IATA - International Air Transport Association IECSC - Inventory of Existing Chemical Substances IMDG - International Maritime Dangerous Goods
IP 346 – A gravimetric assay used to determine the percentage weight of polycyclic aromatics in oil, via a DMSO extraction technique
LC50 - Lethal concentration required to kill 50% of the population
MARPOL - International Conventions for the Prevention of Pollution from Ships NDSL - Non Domestic Substance List
NOAEC - No observed adverse effect concentration NOAEL - No observed adverse effect level
NOEC - No observed effective concentration NTP - National Toxicology Program
NZloc - New Zealand Inventory of chemicals
OECD TG - Organization for Economic Cooperation and Development Test Guidelines OSHA – Occupational, Safety, and Health Administration

PBT – Persistent bioaccumulative toxic chemical PEL – Permissible Exposure Level
PICCS - Philippine Inventory of Chemicals and Chemical Substances PPE - Personal Protective Equipment
PRTR - Pollutant Release and Transfer Register
REACH - Registration, Evaluation, Authorization & restriction of Chemicals SVHC - Substance of Very High Concern
SWISS - Switzerland chemical ordinance TCSCA - Toxic Chemical Substance Control Act TLV – Threshold Limit Value
TSCA - Toxic Substances Control Act TWA – Time Weighted Average
vPvB – very Persistent very Bioaccumulative