1. Identification of the substance / preparation and of the company

1.1 Trade name
Tough PLA

1.2 Use of the product
3D printer filament

1.3 Supplier
Ultimaker B.V.
Watermolenweg 2
4191 PN, Geldermalsen
The Netherlands

Emergency phone number
In case of toxicological emergency, contact your doctor

2. Hazards identification according to regulation (EC) No 1272/2008 and GHS

2.1 Classification of the substance or mixture
No risk exists to the health of users if the product is handled and processed properly

2.2 Label elements
Not applicable

2.3 Other hazards
Not known

3. Composition / information on ingredients

3.1 Composition
Not applicable

3.2 Mixture
Polylactic acid
Acrylic polymer

4. First-aid measures

4.1 Description of first-aid measures

General advice
If you feel unwell, seek medical advice (show the label where possible). Never give anything by mouth to an unconscious person

Inhalation
In case of inhalation of gases released from molten filament, move person into fresh air

Skin contact
Wash with soap and water. Seek medical attention if symptoms occur. If burned by contact with hot material, cool molten material adhering to skin as quickly as possible with water – do not try to peel it off. Seek medical attention, if necessary, for material removal and treatment of the burns

Eye contact
Any material that contacts the eye should be washed out immediately with water. If easy to do, remove contact lenses. Seek medical attention if symptoms persist. If molten material contacts the eye, immediately flush with plenty of water for at least 15 minutes. Seek medical attention immediately

Ingestion
Not probable. Seek medical advice in case ingestion occurs

Note to physician
Treat symptomatically
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 skin is not necessary.

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. Firefighting measures

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

5.2 Extinguishing media
Foam, carbon dioxide (CO₂), water, dry chemical. Alcohol-resistant foams are preferred.

5.3 Special hazards arising from the substance or mixture
Burning produces unpleasant and toxic fumes: carbon oxides (COₓ) and aldehydes.

5.4 Advice for firefighters
Use self-contained breathing apparatus and full protective clothing.

6. Accidental release measures

6.1 Personal precautions, protective equipment, and emergency procedures
Avoid breathing gases released from molten filament. Ensure adequate ventilation, especially in confined areas.

6.2 Environmental precautions
No data available.

6.3 Methods and materials for containment and cleaning up
Allow to solidify molten material. Dispose of waste and residue according to local regulations.

6.4 Reference to other sections
-

7. Handling and storage

7.1 Precautions for safe handling
Avoid contact with molten material.

7.2 Conditions for safe storage, including any incompatibilities
Product should be stored in a dry and cool place at temperatures between -20 to +30 °C. Avoid direct sunlight. Minimize moisture uptake by leaving it in a sealed package with desiccant.

7.3 Specific end use(s)
Filament for 3D printing

8. Exposure controls / personal protection

8.1 Control parameters
DNEL: No data available.
PNEC: No data available.

8.2 Exposure controls
Eye protection
Use safety glasses for prolonged staring at printing.

Skin and body protection
Good practice suggests to minimize skin contact. When material is heated, wear gloves to protect against thermal burns.
Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (when applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be used. Respirator type: air-purifying respirator with an appropriate government-approved (where applicable) air-purifying filter, cartridge, or canister. Contact a health and safety professional or manufacturer for specific information.

Hand protection

Follow good industrial hygiene practices.

Hygiene measures

Follow good industrial hygiene practices.

Engineering measures

Good general ventilation (typically three air changes per hour) is recommended (standard office conditions). Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls that maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

**Appearance**

Filament

**Color**

Various

**Odor**

Odorless

**Flash point**

-

**Ignition temperature**

-

**Thermal decomposition**

-

**Auto-ignition temperature**

> 350 °C

**Melting point / range**

> 140 °C

**Density**

1.22 g/cm³

**Water solubility**

Negligible

**Solubility in other solvents**

-

9.2 Other information

-

10. Stability

Stable under recommended storage conditions

10.1 Reactivity

No data available

10.2 Chemical stability

Chemically stable

10.3 Possibility of hazardous reactions

No decomposition or hazardous reactions if stored and applied as directed

10.4 Conditions to avoid

Print temperatures above 230 °C (at standard printing speeds)

10.5 Incompatible materials

Oxidizing agents and strong bases

10.6 Hazardous decomposition products

See 5.2
11. Toxicological information

11.1 Information on toxicological effects

<table>
<thead>
<tr>
<th>Principal routes of exposure</th>
<th>Eye contact, skin contact, inhalation, ingestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>No data available</td>
</tr>
<tr>
<td>Skin corrosion / irritation</td>
<td>No data available</td>
</tr>
<tr>
<td>Serious eye damage / eye irritation</td>
<td>No data available</td>
</tr>
<tr>
<td>Respiratory or skin sensitization</td>
<td>No data available</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>No data available</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>No data available</td>
</tr>
</tbody>
</table>

12. Ecological information

12.1 Toxicity                                  | No data available                               |
12.2 Persistence and degradability            | No data available                               |
12.3 Bioaccumulative potential                | The main resin is biodegradable                 |
12.4 Mobility in soil                         | No data available                               |
12.5 Results of PBT and vPvB assessment       | No data available                               |
12.6 Other adverse effects                    | No data available                               |

13. Disposal considerations

13.1 Waste treatment methods                  | In accordance with local and national regulations|

14. Transport information

| ADR                                           | No data available                               |
| RID                                           | No data available                               |
| IATA                                          | No data available                               |
| IMDG                                          | No data available                               |
| Special precautions for user                  | -                                               |
15. Regulatory information

15.1 Safety, health, and environmental regulations / legislation specific for the substance or mixture

US Regulations:
- Sara 313 title III
- TSCA Inventory List: Listed
- OSHA hazard category: -
- CERCLA: -
- WHMIS: -
- State right-to-know requirements: -

Other Inventories:
- Canada DSL Inventory List: -
- REACH / EU EINEICS: Listed. Not regulated as hazardous substances
- EU/722/2012: Does not contain human / animal tissue
- NEHAPS: -
- Japan (ECL/MITI): -
- Australia (AICS): -
- Korean toxic substances control act (ECL): -
- Philippines inventory (PICCS): -
- Chinese chemical inventory (IECSC): -

15.2 Chemical Safety Assessment: No data available

16. Other information

The information provided in this Safety Data Sheet (SDS) is based on current knowledge and experience. This information is provided without warranty. This information should help to make an independent determination of the methods to ensure proper and safe use and disposal of the filament.

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