

## ADDITIONAL INFORMATION TIMBERFILL®

Timberfill® is a blend of biopolymers (mostly PLA) with natural wood fibers isolated from spruce. The biggest advantage of Timberfill® is its authentic look resembling real wood, the prints have a rough surface and texture. Prints can be sanded, stained and varnished like real wood. It is biodegradable in industrial compost (a temperature of at least 55 °C, sufficient moisture and the presence of decomposing microorganisms are required for biodegradation).

### FEATURES

- AESTHETICALLY APPEALING WOOD FINISH
- BIODEGRADABILITY IN INDUSTRIAL COMPOST
- EASY TO PRINT
- MINIMAL DEFORMATION
- FRAGRANCE OF WOOD
- PLEASANT NATURAL LOOK
- EASY POST-PROCESSING LIKE WOOD
- EXCELLENT FOR DECORATIVE ITEMS

### WHY CHOOSE TIMBERFILL®?

### BASIC OVERVIEW

#### HARDNESS



#### IMPACT RESISTANCE



#### FLEXIBILITY



#### EASY OF PRINTING



#### WEATHER RESISTANCE



#### WEAR AND ABRASION RESISTANCE



#### HARDNESS

means how "hard" or scratch and dent resistant the material is. Think of it as the difference between rubber and stone - stone is harder, so it's harder to scratch. With 3D printing, harder materials resist damage better, but they can also be more brittle and prone to cracking.

#### IMPACT RESISTANCE

is the ability of a material to withstand impacts or drops without breaking or cracking. Charpy impact strength and Izod impact strength are usually tested.

#### FLEXIBILITY

is the ability of a material to bend or stretch without breaking. Materials with high flexibility can easily adapt to external forces and return to their original shape. This is ideal for parts that need to move or bend, such as flexible joints or guards.

#### EASE OF 3D PRINTING

tells you how easy a material is to print on a 3D printer. This factor includes things like adhesion to the print bed, susceptibility to warping, stringing, and the need for special setups or equipment (e.g., a heated bed or heated chamber). If the material is easy to print, it means that it is easy to work with even for beginners.

#### WEATHER RESISTANCE

refers to how well the material can withstand outdoor conditions such as UV light, rain, wind, frost, or temperature fluctuations. Materials with high weather resistance are ideal for outdoor use because they keep their properties and appearance over the long term.

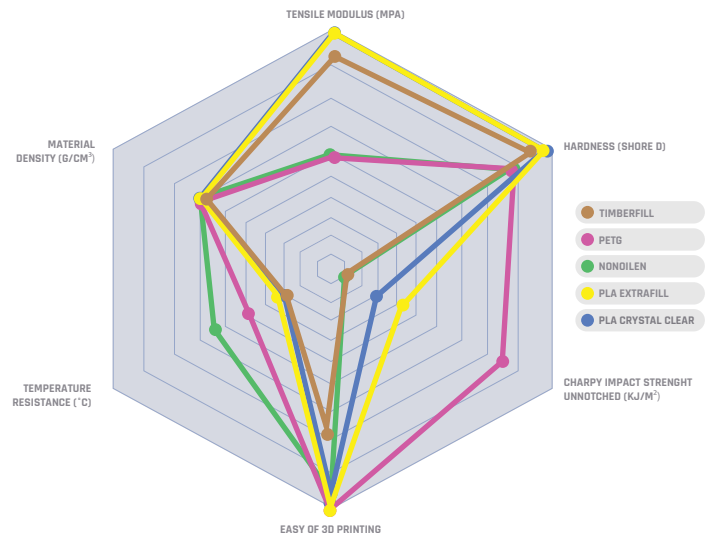
#### WEAR & ABRASION RESISTANCE

is the ability of a material to withstand friction and abrasion. Materials with high wear and abrasion resistance are ideal for parts that are frequently in motion or subject to heavy use, such as gears or bearings.

### COMPARISON WITH SIMILAR MATERIALS

The radar chart is a great helper when comparing the key properties of different materials. How to do it? Each peak of the graph represents one of the important properties: Tensile modulus, Hardness, Charpy impact strength, Ease of 3D printing, Temperature resistance and Material density (you can find a detailed description of the properties below the graph). Each material is shown in the chart with a colored line. The further this line is from the center, the better the material achieves in the given property. This means that the material with the line farthest from the center is better in these properties than the others.

### DETAILED VIEW



#### TENSILE MODULUS

determines how a material responds to stretching. Specifically, it tells how much a material stretches or how "elastic" it is when a tensile force is applied to it. A higher value means the material is rigid and stretches less (is stiff), while a lower value means it is more flexible. It is measured by stretching the material along an axis and recording how it stretches at a certain force. The result is given in megapascals (MPa). The higher the value, the less the material stretches at the same force.

#### HARDNESS

tells how resistant a material is to scratches or indentations. A material with a high hardness is hard to damage, while a softer material is easy to scratch. Shore D hardness is measured using a special device that pushes a spike into the surface of the material and measures how much the spike digs in. Shore D is a scale for harder plastics. A higher value means a harder material.

#### IMPACT STRENGTH UNNOTCHED

tells us how well the material can withstand impacts or blows without breaking. A higher value means that the material can absorb more energy before it cracks or breaks. The test specimen is fixed, the rotating arm with the hammer is raised to a certain height and then released. The arm swings down and hits the sample, which breaks. It measures how much energy (in kilojoules per square meter,  $\text{kJ/m}^2$ ) the material absorbs before it breaks. "Unnotched" means that the material sample has no notches to weaken its structure.

#### EASE OF 3D PRINTING

tells you how easy a material is to print on a 3D printer. This factor includes things like adhesion to the print bed, susceptibility to warping, stringing, and the need for special setups or equipment (e.g., a heated bed or heated chamber). If the material is easy to print, it means that it is easy to work with even for beginners.

#### TEMPERATURE RESISTANCE

is important for applications where prints will be exposed to high temperatures.

#### MATERIAL DENSITY

indicates how heavy a material is in relation to its volume. You can think of this as meaning that if you have two items of the same size, the one with the higher density will be heavier.

## FOOD CONTACT

Imagine you've just printed a custom-designed mug for your morning coffee or a cool salad bowl. You're looking forward to drinking your coffee out of the mug, but beware! If the material is not suitable for food contact, chemicals and harmful substances can be released into your coffee. So, before you print your mug or bowl, please make sure the material is good for food contact.

**TIMBERFILL® is not suitable for food contact.**

For certificate and more information about food contact please contact:



The declaration is based on the present knowledge and experience of the material suppliers. According to the Commission Regulation (EU) No 10/2011 and FDA regulation, it is necessary to determine the migration limits for the final article, that is intended to come into contact with food.

## CHEMICAL RESISTANCE

Imagine you've just printed a great soap holder or detergent container. But if your material isn't chemically resistant, it may start to decompose, soften or even release unpleasant substances under the influence of strong detergent or soap. Knowing the chemical resistance of your material is key to making sure you always use the right material for your artworks.

MATERIAL	PLA EXTRAFILL	NONOILEN®	PLA CRYSTAL	TIMBERFILL
ACETONE	BAD	BAD	BAD	BAD
OILS	GOOD	GOOD	GOOD	GOOD
ALCOHOLS	GOOD	GOOD	GOOD	GOOD
ETHANOL	GOOD	GOOD	GOOD	GOOD
CAR FLUIDS	BAD	BAD	BAD	BAD
GREASES	GOOD	GOOD	BAD	BAD
WATER	GOOD	GOOD	GOOD	GOOD
ACIDS	GOOD	BAD	GOOD	GOOD
ALKALIS	BAD	BAD	BAD	BAD

What does that mean?

### GOOD

means that the material resists very well, does not absorb chemicals, does not change volume, color or properties.

### MEDIUM

means that the material changes shape and weight slightly.

### BAD

means the material changes its properties significantly, may dissolve or change color.

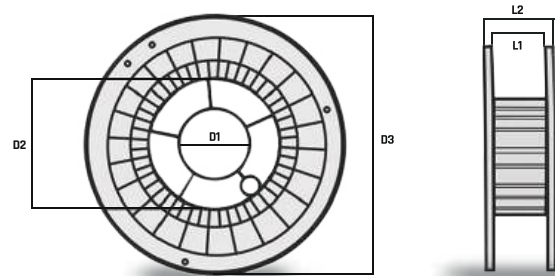
For better chemical resistance, it is recommended to use more perimeters, bottom/top layers, higher temperature of printing to achieve good tightness. These groups of chemical substances are very general. The resistance depends on the exact type of substance. It describes the resistance at 25 °C, the elevated temperature must be tested. Always try a little printed object first!

## SPOOL DIMENSION

You can buy our materials on these spool types:

(The length is given in millimeters and the weight in grams.)

SPOOL	D1	D2	D3	L1	L2	WEIGHT OF EMPTY SPOOL	COLOR	MATERIAL
RS 200 GH2L	52	105	200	45	55	210	GRAY	RECYCLED PP



## OTHERS

RoHS and REACH are important European directives that ensure the safety of materials and products.

### ROHS (RESTRICTION OF HAZARDOUS SUBSTANCES)

is a European directive that restricts the use of certain hazardous substances in electrical and electronic equipment. The aim is to reduce the risk to health and the environment by banning the use of hazardous chemicals such as lead, mercury, cadmium and some others.

### REACH (REGISTRATION, EVALUATION, AUTHORISATION, AND RESTRICTION OF CHEMICALS)

is a European regulation that governs the registration, evaluation, authorisation and restriction of chemicals. Based on this regulation, a safety data sheet is prepared for each material, which contains safety, environmental, toxicological information. It contains, for example, workplace safety rules, recommendations for handling the material, precautions in case of fire, information on first aid, etc.

If the material meets these standards, you can be sure that it does not contain hazardous substances and is processed in accordance with strict safety standards.

Fillamentum Manufacturing Czech s.r.o. declares that all Fillamentum products (3D printing filaments) are manufactured in compliance with RoHS and REACH regulations. Relevant documents can be obtained on request by email:

