

GLOSSARY

A

ABS Juice – popular adhesion agent among hobbyists, which can be self-made by the printer user. It is used to cover the table with a layer that prevents models from peeling off that are printed using following materials: ABS, ASA, HIPS. It is created using a solvent based on acetone and any model printed from ABS material. The model placed in the solvent is dissolved, creating a solution called ABS juice.

Acetone treatment – a form of chemical post-processing, dedicated for printouts made of ABS or ASA material. It is based on smoothing the surface of the printout by the action of acetone in gaseous form. In practice, the whole process dissolves the outer layers of the model, which makes it similar to models made by casting.

Adhesive agent - it is a product used to cover the work surface of the 3D printer bed with a layer that prevents the model from peeling off during the printing process. The use of adhesives is particularly important when using technical materials that have a shrinkage during the printing process.

B

Bed autolevelling – the process of adjusting the position of the heated bed in order to ensure perfect levelling of the plane on which the 3D print is created.

BI-touch – mechanical sensor responsible for bed auto-levelling. The sensor takes measurements with an extendable tip and works basing on the Hall effect.

Bridge - This term is used to describe the situation when the printing head applies a layer not supported from underneath (e.g.: between two elements). Most geometric shapes of models that have a large overhang are printed with the help of support structures that are designed to better deposit layers, which would otherwise fall under gravity. It is possible to print short straight sections (usually connecting two different sticking out elements of the model) without the need to generate printed support structures. The printer then makes the bridge overhang layer at a much lower speed and with a stronger blow of fans to cool the printout.

Brim – printed paths that form a border around the model, directly adjacent to it. This increases the surface of the model that is in contact with the heated bed, which is important when printing from materials with high shrinkage rate.

C

Cart – a part of the printer resting on linear guides. It is the base for attaching the print head.

Coasting - situation in which the printing head stops to deliver the filament a few [mm] before reaching the end of the contour of the layer. Depending on the distance of the coasting parameter, this phenomenon helps make the seam less visible on the model.

E

Elephant foot – visual effect of the model resulting in overly flattened first layers of the model. As the subsequent layers are printed, the model is printed correctly, however, when observing the model along its walls, a thickening is very clearly visible on the first layers. This phenomenon occurs when the temperature of the table is too high for the printed material, which causes the first layers to additionally melt on the sides. The elephant's foot phenomenon is also happening while there is an incorrectly calibrated work bed, mainly when the nozzle for the first layer is too close to the work bed, which causes the first layers to additionally flatten the material.

Endstop – sensor of the end position to prevent the trolley from colliding with the 3D printer frame elements

Extruder – mechanism which is a part of the printing head. It is responsible for taking the filament from the spool and pumping it into the heat block.

Extrusion – parameter of molten filament pumping through the nozzle, expressed in [mm/s].

F

FFF/FDM – 3D printing technology, which involves applying molten plastic layer by layer until the full height of the printed model is reached. The applied layer is bonded with the previous one using high temperature.

Filament – material used in the 3D printing process on devices working in FFF (FDM) technology. Two most common filament diameters are: (1.75 mm and 2.85 mm).

Filament sensor – sensor, which detects the presence of the filament. It prevents the possibility of printing in case the filament on the spool is finished. When the lack of filament is detected, the printing process is paused.

G

G-code – a programming language used in numerically controlled devices, including 3D printers. The G-code file is a set of commands that are successively read and executed by the printer. A g-code file contains information such as movements of the printer, speeds and temperatures of the printing process.

H

Heated bed – 3D printer working platform on which prints are made. It is equipped with a heater and thermistor, thanks to which it is possible to obtain temperatures recommended for printing with the use of specific technical filaments, e.g. ABS.

Hobbed bolt (extrusion gear) – a part of the extruder responsible for pumping the filament into the hot end thanks to special cuts.

Hot end – a part of the print head element located directly behind the extruder. It is a channel that leads filament from the extruder exit to the area where it is melted. It consists of:

heatbreak – it is a channel that guides the filament (there are two varieties: full metal – without a Teflon tube inside, and regular – with a Teflon tube inside).

heatsink – it dissipates heat from the heatbreak,

heating block with heater and thermistor installed – used for melting the filament,

nozzle – the end part of the hot end through which molten filament is fed. Nozzles come in different diameters depending on the manufacturer, usually the range from 0.15 to 1.2 mm.

I

Idle move – movement of the head during which filament is not being extruded (e.g. movement between two models printed at the same time).

Infill – the internal structure of the printed model with various patterns. It is a parameter that determines the strength and weight of the object, but also the strain occurring during the 3D printing process. This parameter is expressed in [%].

L

Layer height – the height of a single layer, forming a model. The lower the value of the layer height, the more accurately the model is reproduced and the visual effect of the outer walls is much nicer. The higher the value of the layer height, the less accurate the model is, the outlines of the layers are clearly visible on the outer walls, but the printing time is much shorter than with low layer heights.

The layer height is closely related to the diameter of the nozzle used. It is assumed that the layer height should not exceed half of the nozzle diameter. This is related to obtaining high quality prints.

M

Material shrinkage - An undesirable effect in the 3D printing process, which reduces the volume of the material as a result of sudden temperature change.

O

Ooze shield - term used to describe a structure in the form of a printed border, generated by a slicer that is printed at the same time around the model. This refers to a situation where the model is printed using two different filaments simultaneously. The Ooze shield is designed to collect the fragments of the self-leaking filament from an inactive head.

Overhang layer - a term used to describe where the model layer is printed at a very large angle, which exposes it to falling under gravity. In order to prevent layers from falling down at sensitive points, support structures are used which are printed simultaneously with the model to provide support for layers that are printed at a large angle.

P

Postprocessing – term used to describe any action to get rid of printing imperfections. Postprocessing takes many forms. The model can be improved mechanically, e.g. by milling, or chemically, e.g. by smoothing the walls with a chemical agent. Mechanical breaking out of printed supports also belongs to the form of postprocessing.

Prime pillar – term used to describe a structure in the form of a tower, generated by a slicer, which is printed simultaneously next to the model. This refers to a situation where a model is printed using two

different filaments simultaneously. The tower is designed to ensure the continuity of filament feed during changes of printing head .

Printing head – the main part of the 3D printer. It consists of:

an extruder,

a hot end,

a cooling system.

Preset – set of printing parameter settings (speed, temperature, cooling, etc.) stored in the slicer. The defined profile of the settings allows for comfortable and efficient work with the machine, because the user does not have to define the settings for the model every time he wants to print.

R

Raft – a printed platform on which the target model is subsequently printed. Rafts are used to avoid printing directly on the surface of the heated bed. After the printing process is completed, the raft platform is detached from the bottom layer of the target model.

Retraction – a parameter expressed in [mm] specifying the length by which the filament is withdrawn during idle move. Retraction prevents spontaneous flow of the filament from the tip of the nozzle caused by gravity, which leaves unaesthetic filament threads on prints.

S

Seam – the term determining where the printer starts and ends the contour layer. Usually, a visible mark remains in such places and with each subsequent layer of seam takes the form of a vertical joint. This is a very visible structure, which is not desirable due to the unsatisfying visual effect of the model.

Shell – external structure of the printed model, printed in the form of paths forming the walls of the model.

Skirt – printed paths that create a border around the model that is not directly adjacent to it.

Slicer – software used for preparing models for 3D printing. While preparing the model, the software divides it into layers and creates a 3D printing process simulation preview. The prepared model for printing is always in g-code format.

STL – a 3D model file format supported by Slicer. If a file is available in this format, the user can prepare a model for 3D printing and generate a g-code file, read by the 3D printer.

Support – structure in the form of a scaffolding, which allows for the printing of model layers with a large overhang angle. The supports are then broken out after the printing process is completed.

W

Wipe – term describing a specific movement of the printer that is similar to the quick movement of a nozzle wiping at the end of a model contour layer. Depending on the wiping distance, this movement helps to make the seam less visible on the model.

Wobbling – visual effect resulting in the formation of repeating stripes on the model walls. This is caused by a mechanical problem with the Z axis system. The stripe effect is caused by the trapezoidal nut, which works with the trapezoidal threaded screw. When the trapezoidal screw is non-axial, the nut moves when the screw rotates, causing the work bed surface to move. There are also a number of other mechanical factors that can affect the formation of stripes visible on the printing walls.