



Sinterit Lisa Pro

USER MANUAL



Read the instruction manual before using the device

Version 1





Lisa Pro gives the full range of possibilities of the professional SLS printing at the office, lab or workshop!

How the Lisa Pro printer works:

The Sinterit Lisa desktop 3D printer uses selective laser sintering technology to produce your prints. Within its chambers, a powdered material is heated up and turned into a solid mass with by a concentrated laser beam. Layers of polymer powder are placed onto the printer's work platform, where they are selectively sintered, giving perfect industrial-quality prints:

- small elements with details,
- complicated structures,
- complex solid shapes with moving parts in one go,
- simultaneous multi-objects prints,
- extremely durable models against unfavourable conditions (such as temperature),
- solid, lightweight parts,
- and much, much more...

Main features:

- Precision: high accuracy of prints thanks to layer thickness from 0.075 [mm],
- improved UX,
- wider choice of materials,
- built-in nitrogen chamber,
- 7-inch touch screen: for a friendlier user experience,
- Wi-Fi connectivity,
- Dedicated software suite - Sinterit Studio 2019 supporting formats STL, OBJ, 3DS, FBX, DAE and 3MF,
- Economic: powder recovery system allows printing with up to 100% recycled powder.

Printer perfect for:

- Functional testing,
- Rapid prototyping,
- Low volume manufacturing,
- High-heat and chemical resistant applications.



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1. Dictionary

The following terms and forms have been adopted and used in the manual.

1. **SINTERIT LISA PRO 3D PRINTER** – (LISA PRO, 3D printer, printer, machine, device) – a selective laser sintering (SLS) machine used in additive manufacturing (AM) processes. Device dedicated for professional and quick manufacturing of three dimensional (3D) models of spatial objects.
2. **SINTERIT STUDIO 2019** (STUDIO, Sinterit STUDIO)– dedicated software for the Sinterit LISA Printer. Sinterit STUDIO as a desktop application allows to prepare 3D models (set them in the printable area - called PRINT BED) and track the print status of the printer during the printing process.
3. **MATERIAL, POWDER, PA, FLEXA, TPE** – powder material dedicated for printing in SLS technology. A powder from the PA, TPU or TPE group, with granulation 20-105 [µm] and the sintering temperature up to 195 [°C].
4. **RECOATER** – a RECOATER in the form of a roller, moving on a guide bar by means of a wire. Used to transfer the powder from the FEED BED to the PRINT BED during the printing process.
5. **FEED BED** (SOURCE, SOURCE BED) – a chamber storing new, unsintered powder.
6. **PRINT BED** – a chamber where the sintering of powder takes place, creating the print.
7. **OVERFLOW BIN** – a chamber used to collect the excess unsintered powder, transferred from the FEED BED to the PRINT BED by the RECOATER.
8. **NITROGEN CHAMBER** - built-in chamber that is an integral part of the device, allowing connect gas (nitrogen or argon) and working in a controlled atmosphere. Only some powders are suitable for printing using it. Check the description on the material.
9. **FRESH POWDER** – virgin powder, used for refreshing PA12 SMOOTH and PA11 ONYX. Needs to be mixed with the used powder in correct proportions. FRESH POWDER is not suitable for printing (the print may not be successful).
10. **USED POWDER** – all the unsintered powder that remains after the printing and cleaning process. Suitable for printing if we are using TPU based material. If using material from PA group and TPE - suitable for printing after refreshing by adding FRESH POWDER, in indicated by the software proportions (different for every material).
11. **PRINT READY POWDER** – powder ready to be used by the printer - combination of sintered in the previous printing process USED POWDER and FRESH POWDER.



A. Contents of the Sinterit LISA PRO pack

- The Sinterit LISA PRO 3D Printer;
- A package for the additional equipment.











1. Plate for carrying the prints / 2. Molds to cool prints / 3. Powder trowel / 4. Plastic, measuring cup / 5. Metal strainer / 6. Sinterit mug / 7. Sinterit STUDIO User Manual / 8. Sinterit LISA PRO User Manual / 9. Spatula for getting out the powder / 10. USB Flash Drive with Sinterit Studio 2019 / 11. Ignition key / 12. Stylus pen / 13. Brush / 14. Two-piece set of large brushes / 15. Three-piece set of small brushes / 16. Metal detail purifiers / 17. Laser protective glass / 18. Protective glasses / 19. Pair of protective gloves / 20. Silicone grease / 21. Ethyl alcohol / 22. Power cable / 23. Set of plastic spatulas / 24. Spare Recoater wire / 25. Protective dust mask













2. Marking text conventions used in the document

Listed below are descriptions of symbols used on the device. They constitute a warning or convey the information to protect the user, other individuals or surrounding objects and ensure correct and safe use of the device.

	WARNING! An inevitably dangerous situation which can result in serious injury or even death. Initiation, omission of a specific procedure or inattention can cause severe physical injury to the user.
	ATTENTION! Initiation or omission of a specific procedure can cause physical damage to the equipment or the user.
	WARNING! Risk of electric shock which can be fatal or cause severe burns. An inevitably dangerous situation which can result in serious injury or even death, if not mitigated. Before working with any equipment, you should be aware of the dangers associated with the flow of electric current, and become familiar with the standard procedures to prevent accidents.
 	WARNING! Compressed gas Possibility of unsealing - gas has a suffocating effect on people by displacing oxygen from the air. Too low oxygen concentration in the air can lead to unconsciousness and death*. Inhalation exposure may cause short breath, breathing difficulties, headaches and dizziness, with high concentrations of gas disorders of orientation, nausea, fainting, loss of consciousness, death.
	ATTENTION! Risk of electric shock.
	CAUTION! High temperature – do not touch. Excess heat dissipation can cause burns.
	CAUTION! IR laser radiation. Looking directly into the laser beam can cause blindness and skin burns. The laser emits infrared radiation (infrared, IR), which is invisible to humans. Avoid eye or skin exposure to direct or scattered radiation. Do not stare into the beam or view with optical instruments.



	CAUTION! Beware of intense light.
	CAUTION! Beware of moving parts which can crush hands.
	CAUTION! Beware of sharp edges which can cause body cuts and injury.
	CAUTION! Beware of moving parts which can snag and pull.
	WARNING! Avoid fire! Powder dust is flammable.
	STOP! Action prohibited.
	IMPORTANT! Information essential to correctly perform a specific task.
	ATTENTION! It is necessary to wear protective gloves. Mandatory action when working with powder.
	ATTENTION! It is necessary to wear protective face mask. Mandatory when working with powder.
	IMPORTANT! You must read the instructions before taking action.



3. Sinterit Lisa Pro 3D printer

A. Description



Image 1. View of the printer's front and back side.

1.Removable front panel / 2.LCD panel - camera view / 3.Fan / 4.Holders

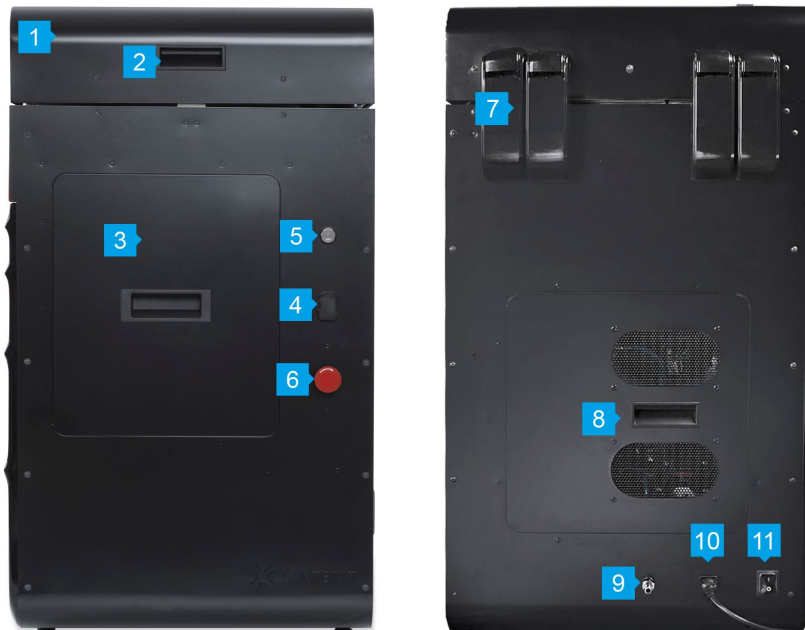


Image 2. View of the printer's right and left side.

1.Printer's lid / 2.Lid's handle / 3.Overflow Bin / 4.USB port / 5.Safety key switch / 6.Safety button (E-STOP) / 7.Lid's Hinges / 8.Access to gas Installation / 9.Gas input / 10.Power socket / 11.Power switch



Image 3. View of the printer's gas installation.

- 1.Lid's Hinges / 2.Gas installation housing / 3.Gas input / 4.Power switch / 5.Power socket / 6.Nitrogen hoses / 7.T-piece of the pressure sensor / 8.Oxygen level sensor / 9.Rotameter / 10.Electrovalve / 11.Pressure reducer with manometer / 12.Throttle valve**



Image 4. View of the printer without front panel.

- 1.Magnetic fasteners / 2.Handles / 3.Easy access to the space under Beds**

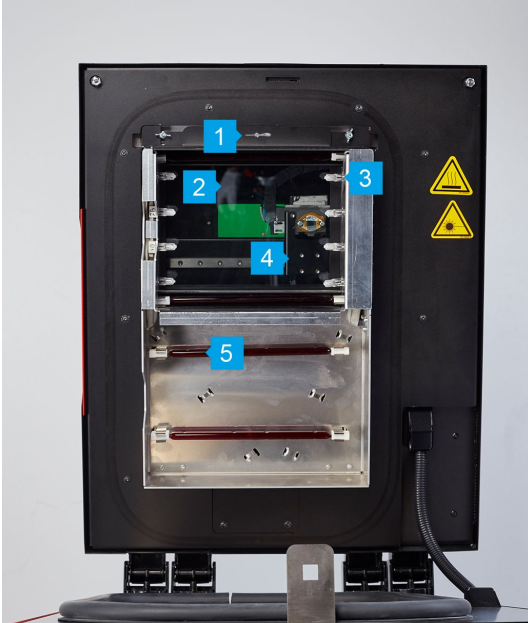


Image 5. View of the printer's heater module.
1.Split pin / 2.Laser protective glass / 3.Infrared heaters (short, white) four psc. on each side / 4.Laser system / 5.Infrared heaters (long, red)

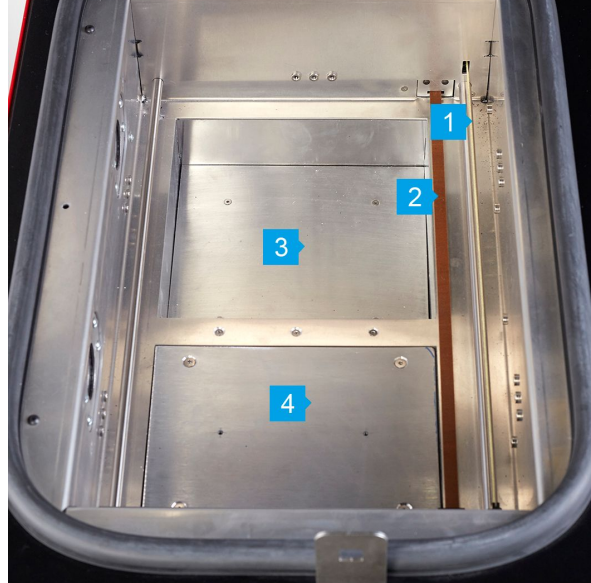


Image 6. Front view of the printer's inner chamber.
1.Recoater's slide guide / 2.Recoater's transmission cables: short (replaceable) and long / 3.Feed Bed / 4.Print Bed



Image 7. Back view of the printer's inner chamber.
1.Embedded camera (captures image from the Print Bed) / 2.Print Bed pyrometer / 3.Feed Bed Pyrometer / 4.Recoater

B. Specification

GENERAL

Category	3D printer
Printing technology	Selective Laser Sintering (SLS)

HARDWARE

Dimensions	680 x 510 x 900 [mm] (27.1 x 19.7 x 34.6 [in])
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Total weight	89,0 [kg] (198 [lbs])
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PACKAGING

Size of package	730 x 630 x 1040 [mm] (28.7 x 24.8 x 40.9 [in])
Package weight	150 [kg] (331 [lbs])
Package contains	Sinterit LISA Printer + set of accessories + Manuals

POWER

Power supply	220-240 [V] AC, 50/60 [Hz], 7 [A] (100-130 [V] AC, 50/60 [Hz], 15 [A])
Average power consumption	1 [kW]
Maximum power consumption	1,8 [kW]
Type of laser	Class 4, IR 5 [W]; $\lambda = 808$ [nm]
Beam divergence	$\theta = 10$ [°]
Beam output	CW (continuous wave)

INDEPENDENT HEATING SYSTEM

Multi zone	Heated piston, cylinder, FEED BED, PRINT BED
Max. temperature in the chamber	210 [°C] / 392 [°F]

ADDITIONAL PRINTER FEATURES

Nitrogen chamber	Built-in
Coupling installed in LISA PRO	Pneumatic quick-coupling Male Plug Nipple DN7.2
Average Nitrogen consumption	8 [l/min] = 0,48 [m ³ /hour]

PRINTER PARAMETERS

Size of Print Bed	150 x 200 x 260 [mm] (5.9 x 7.9 x 10.2 [in])
High accuracy max. print volume	FLEXA & TPE - 110 x 150 x 250 [mm] (4.3 x 5,9 x 9.8 [in])
	PA - 90 x 130 x 230 [mm] (3.5 x 5,12 x 9 [in])
XY accuracy	from 0,05 [mm] (0.002 [in])
Min. layer thickness	0,075 [mm] (0.003 [in])
Min. wall thickness XZ	0,4 [mm] (0.015 [in])
The layer height Z (min-max)	0,075-0,175 [mm] (0.003-0.007 [in])



SOFTWARE

Control software/firmware	Sinterit STUDIO 2019
Operated file formats	STL, OBJ, 3DS, FBX, DAE, 3MF ¹
OS compatibility	Microsoft Windows

COMMUNICATION

LCD touchscreen	Capacitive, colour - 7 [in]
On-board camera	Built-in
External communication	USB, WiFi

SAFETY

IEC protection class	Class I
Laser product class	Class 1, invisible laser radiation

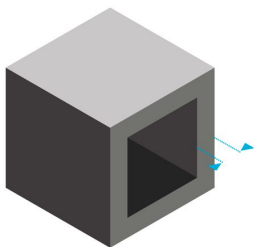


IMPORTANT!

Variety of powders compatible with this model of printer available on www.sinterit.com or in online store on <https://www.sinterit.com/shop>

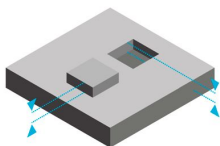
LISA PRO supports all available Sinterit powders, so their use is limited only by your version of Sinterit STUDIO 2019. More information is available at www.sinterit.com/sinterit-studio-2019

C. Parameters - print design guide



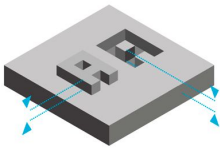
Wall thickness

The 3D model's wall must be thick enough to support the model. We recommend working with 0,8 [mm] for larger objects, in smaller objects you can have a lower wall thickness of 0,4 [mm].



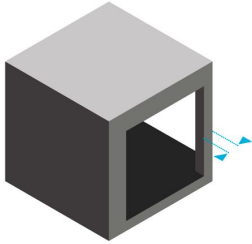
Embossed and engraved details - minimum detail size

Selective Laser Sintering is one of the 3D Printing processes with the highest accuracy; up to 0,1 [mm] is enough to create clearly visible details. If you plan to put some embossed and engraved DETAILS, we recommend adding the minimum thickness of 0,15 [mm] and depth of 0,15 [mm].



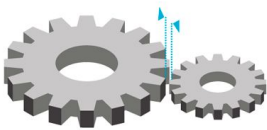
Embossed and engraved text

If you plan to put some TEXT embossed we recommend adding a minimum line thickness of 0,5-0,6 [mm] and a depth of 0,5 [mm]. Use a bold sans-serif font for readability, such as Arial Bold f.ex.



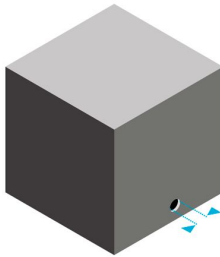
Minimum feature size

The minimum feature size for printing with SLS is 1 [mm]. If your feature is a thin wire connected on both sides, you can go slightly thinner to 0,5 [mm], otherwise, we recommend at least 0,8 [mm] thickness.



Functional gap - moving or interlocking parts

A powerful feature of SLS is that you can print moving parts in one go. You should keep at least 0,2 [mm] clearance between elements. We recommend keeping at least 0,5 [mm] if you are the beginning user.



Escape holes

Sometimes you have to increase your clearance or create extra escape holes for the powder to get out f.ex when you have moving parts like hinges over a long distance. We recommend making in the model at least 4 [mm] diameter for one escape hole, 2 [mm] for two or more.



4. Installation of printer

To ensure safe use of the Sinterit LISA PRO Printer, please read and follow the instructions below. Keep this manual for future use. Also, be sure to follow all warnings and instructions marked on the product.

	<p>WARNING! Only trained and qualified personnel should install, replace or service the equipment. The device should be installed in accordance with these instructions and by trained personnel.</p>
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The device can be transported only in its original package in the way that prevents it from moving inside. It should be also thoroughly protected against any environmental factors that could affect it.

The device should be stored indoors in original packages in spaces without chemical fumes or reactive substances, at temperature between 0°C+40°C and relative humidity not higher than 80%.

A. Environment and place of installation

- The Sinterit LISA PRO Printer should be placed at room temperature.
- The room must be well ventilated, adequately to its size.
- The product should be placed on a flat, stable surface that extends beyond all edges of the product. If you place the product by the wall, the distance between the product and the wall should be greater than 500 [mm] (20 [in]).
- The product will not work properly if it is set at an angle.
- The device should be used in a room at around 22°C and should not be placed near air conditioners' vents.

	<p>ATTENTION! Do not place or store the product:</p> <ul style="list-style-type: none">• outdoors;• in areas with large amounts of dust;• in places subject to shocks, vibrations, high temperature and/or humidity, and extreme changes in temperature and humidity;• near water, or heat sources;• near inflammable and volatile substances, concentrated acids or corrosive vapours;• in places easily accessible to children and animals.
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	<p>ATTENTION!</p> <ul style="list-style-type: none">• Never use wood, equipment with wooden elements and flammable substances while working with the printer.• The min. distance between the printer and wooden parts is 500 [mm].• The printer emits large amounts of heat (80°C), and therefore it is prohibited to place it on the wood or wooden furniture.
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B. Power supply:

- Use only the power cord supplied with the product.
- The printer must be connected to a grounded outlet to prevent electric shock in the event of a fault.
- When connecting/disconnecting the plug to/from the power source always hold the cover, not the cord.

	<p>WARNING! Do not use cables from other devices. Using the power cables from other devices or connecting the power cord supplied with the product to other devices may cause fire or electric shock.</p>
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	<p>ATTENTION! Never disassemble, modify or repair the power cord, plug, devices inside the printer, except as described in the product manual.</p>
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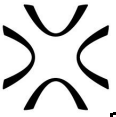
- The product should be placed near a wall outlet, which can be easily unplugged.
- It is recommended to use UPS units that, in the case of a momentary power failure, will allow the printing process to finalise.
- When an extension cord is used for the power supply of the product, make sure that the total power consumption of all devices connected to it does not exceed the extension cord's limit. Also, make sure that the total current drawn by connected equipment does not exceed the ampere rating for AC wall outlet.
- Power cables should be placed in such a place that they are not rubbed, cut, pulled or twisted.

	<p>ATTENTION! Do not place objects on the power wires. Do not place power cords in path where people will have to walk or run. Pay special attention to the fact that the power cables are not bent at the points of connection of the printer. Disconnect the plug whenever it is planned to shift/transfer the machine.</p>
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In the following situations, unplug the product from the power supply and contact a qualified service personnel:

1. the power cord or plug is damaged,
2. some liquid got into the product,
3. the product has been dropped or the case has been damaged;
4. the product does not operate properly or clear changes in efficiency have been observed.

Do not adjust controls that are not described in the manual.



ATTENTION!

Do not:

- spill liquid on the product;
- put any containers on the equipment, in particular containing water;
- handle it with wet hands;
- block or cover the vents and openings in the product;
- touch movable parts.



ATTENTION!

If the device is not used for a long time (e.g. vacation), unplug the power cord from the socket.





5. Sinterit STUDIO 2019 software - installation



Technical requirements to install Sinterit STUDIO 2019:

64-bit processor, Windows 7 or higher, Minimum 1 GB of disk space, Minimum 2 GB of RAM, Graphics adapter compatible with OpenGL 3.0 or higher.

1. Connect the USB flash drive included in the set to the computer USB port.
2. Locate the Sinterit Studio folder.
3. Open SinteritStudioSetup.exe.
4. Select the language for the installation.
5. Act accordingly to the messages on the installation screen.
6. After the installation, the software is ready to be used.

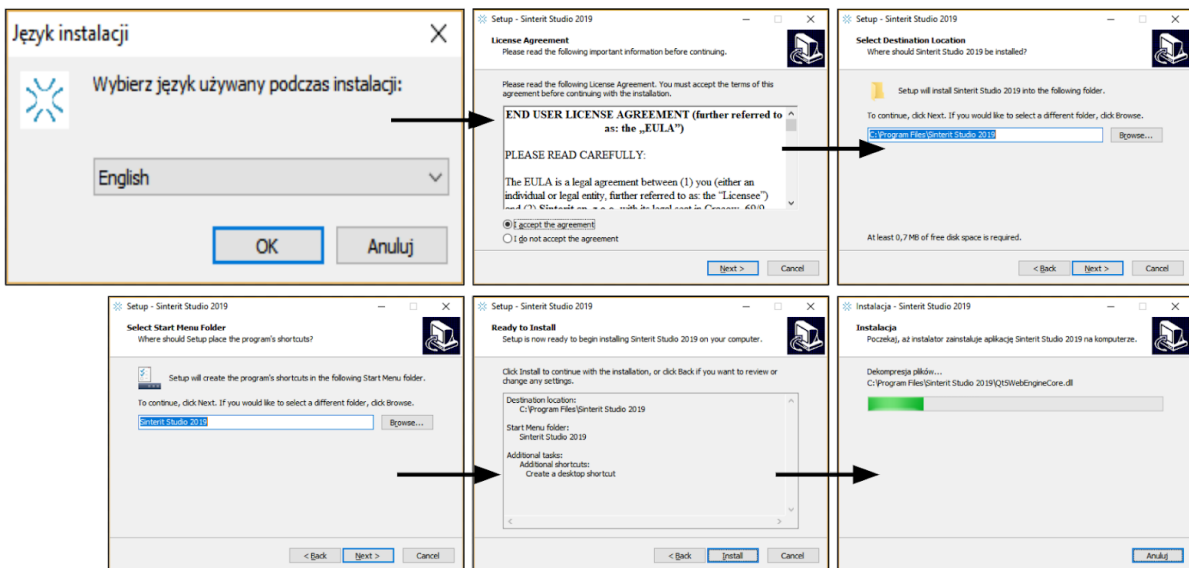


Image 8. Installing Sinterit STUDIO 2019.



IMPORTANT!

Be sure to carefully read the license agreements and accept them.



6. Initial startup of the machine after delivery

1. Carefully take the printer out of the protective package.
2. Use the handles placed on the printer's housing located on the front and back.
3. Because of high weight, we recommend doing following steps by at least two people.
4. Place on a stable and hard surface (ideally the target location of the printer).

	ATTENTION! The printer weighs almost 100 kg. Make sure that the furniture or surface that you plan to place the printer on is appropriate for such load.
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5. Carefully discard protective foil and paper. Remember about removing the protective foil from the door of nitrogen chamber and from the touchscreen housing.
6. In the top cover of the Flight Case, find the printer's front panel. Lay it aside with its flat side down until finishing the installation process.
7. Connect the power cord to the printer's power socket.
8. Switch the power switch (from "0" to "1") located on the left side.
9. Check whether the red Safety button (E-STOP) is out. If not, rotate it clockwise at a quarter of a turn (the black flange of the button).



Image 9. Off/On key positions.

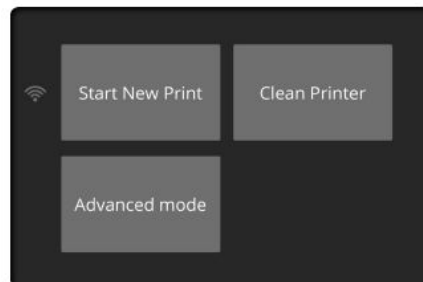


Image 10. Initial screen of LISA PRO.

10. Place the Safety key in the ignition and turn clockwise at a quarter of a turn. After a moment, the machine will start.
11. After switching on the Sinterit LISA PRO the startup screen will be displayed.
12. Three functions will be displayed: START NEW PRINT, CLEAN PRINTER and ADVANCED MODE. ADVANCED MODE is also a previous software version.
13. Choose START NEW PRINT to open the printer's lid.
14. Choose an UNLOCK LID option. The lock deactivates for 10 seconds. After 10 seconds the lock will become active again.

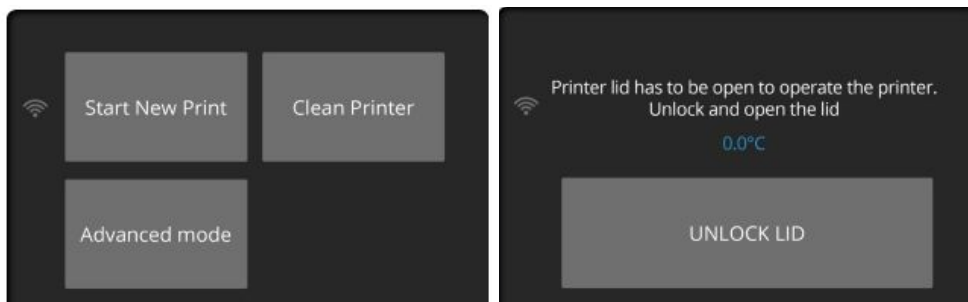


Image 12. Main screen of LISA PRO and UNLOCK LID screen.



15. **Softly press** the lid and then lift it.
16. Turn the power off (use the power switch) and disconnect the power cord from the socket.
17. Carefully discard the transport protections located on the inside, also those surrounding the laser.

7. Connecting the printer to Wi-Fi network

To connect the printer to a Wi-Fi network choose **ADVANCED MODE** option.

	<p>IMPORTANT!</p> <p>ADVANCED MODE should be chosen when Sinterit LISA PRO printer is used for the first time, to set the printer to Wi-Fi network.</p> <p>ADVANCED MODE is also the previous software version. We recommend to stay with the new version of software. To do it switch the printer off and then on again.</p>
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1. On the Printer's LCD panel, select **ADVANCED MODE // ADVANCED // SELECT WI-FI**.
2. Find the network you want to connect to and click on its name.
3. Enter your password if necessary and press **OK**.
4. Next to the **SELECT WI-FI** you see the combined network.
5. Press the **BACK** button (top-left button on LCD screen) to back to main menu of **ADVANCED MODE**.
6. If you want to return to the **STANDARD MODE** menu, turn the printer off and on again.



Image 11. Connect to Wi-Fi.

	<p>CAUTION!</p> <p>When lid is open, beware of strong light.</p>
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8. Preparing the machine to print for the first time

A. Install the LASER PROTECTIVE GLASS



CAUTION!

Beware of sharp edges. Put on the safety gloves in order to protect yourself from injuring the hand against the edge of the heating module.

1. Turn of the safety key switch and turn off the power switch.
2. While holding the heater module, take out the split pin positioned on the top of the inner part of the lid.
3. Lower the heating module to get access to the place dedicated for the LASER PROTECTIVE GLASS.
4. Unscrew two knurled nuts from the LASER PROTECTIVE GLASS module.
5. Remove the module from the locking holders located in the middle of the lid.

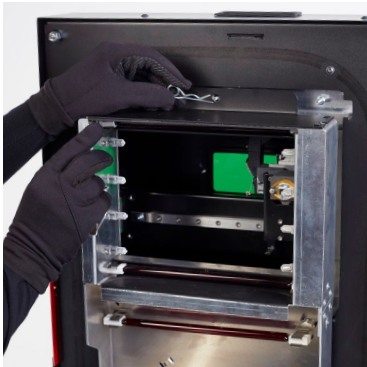


Image 12. Heater module - split pin system.



Image 13. Heater module - opening.

6. Take out the LASER PROTECTIVE GLASS out of the box (from the additional equipment package).
7. Rub the surface of glass carefully with a cotton cloth soaked with 2% salicylic acid (ethanol solution) or any other ethanol-based solution. Do not use isopropyl alcohol! Pay attention to any fibers left on the surface. Clean both sides.



Image 14. Repackaging of LASER PROTECTIVE GLASS.



Image 15. Cleaning of LASER PROTECTIVE GLASS.



8. Mount the glass: slide the metal tabs of the LASER PROTECTIVE GLASS module into the holders located in the middle of the lid. Press gasket gently. After obtaining the perfect fit, screw the knurled nuts on to the visible screws.



Image 16. Correct placement of the LASER PROTECTIVE GLASS on the heating module.

9. Join the heating module with the lid - using the metal split pin.
10. Clean the glass one more time from any finger marks or stains if present.

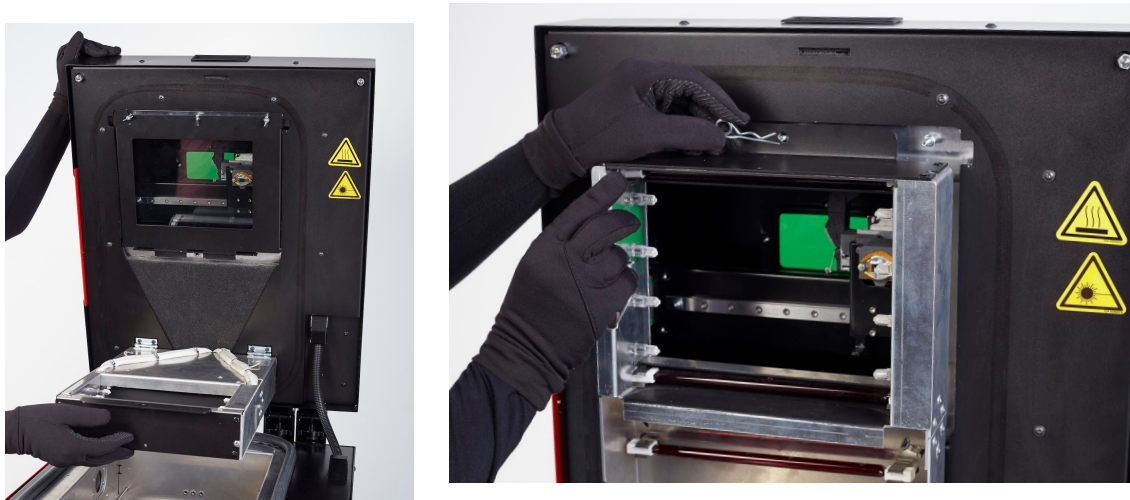


Image 17. Correct closing of the heating module.

B. Next steps required to use the printer for the first time

1. Check (wearing gloves or through paper – see image above) whether the heaters are stable in their sockets. If there is any dust/powder on them, blow it gently off with air.



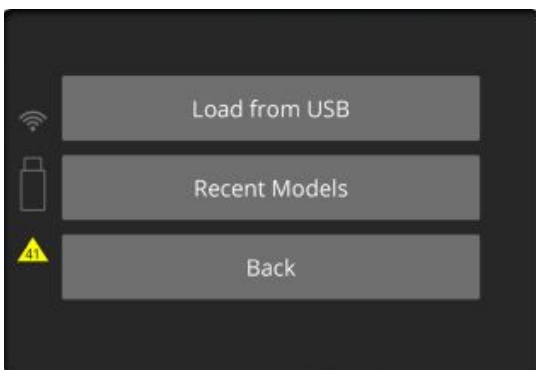
Image 18. Methods of verifying the setting of the heaters.



ATTENTION!

Remember, do not touch the heating bulbs with your fingers or greasy objects (eg. a dirty cloth).
Dirt and grease may cause local overheating and burn the heaters or even cause an explosion during printing.

2. Verify whether the FEED BED and PRINT BED are ready to work (during the initial startup, after unpacking, the Beds should be on par with the printer's case), check the Recoater's transmission cables tension and whether the Recoater's slide guide is clean.
3. Disassemble the Recoater cover and wipe the rotating shaft with a wool cloth saturated with alcohol.
4. After carrying out all of these steps, the printer may once again be connected to the power source, turned on and prepared for work.



IMPORTANT!

Yellow triangle displayed on the side of the screen informs about a malfunction.

Please contact the Support Team (section 11, subpoint G) by referring to the code displayed inside the warning triangle and providing the serial number of the device.



9. Printing - STANDARD MODE

A. Preparing for printing

1. Load the file for printing:
 - a. save the file prepared using the Sinterit STUDIO 2019 to a USB carrier (USB flash drive recommended).
 - b. connect the carrier to the printer's USB port, with its power turned on.
2. After mounting the flash drive into LISA PRO USB port, LOAD FROM USB section will be displayed and a flash drive icon will appear on the left side of sections.

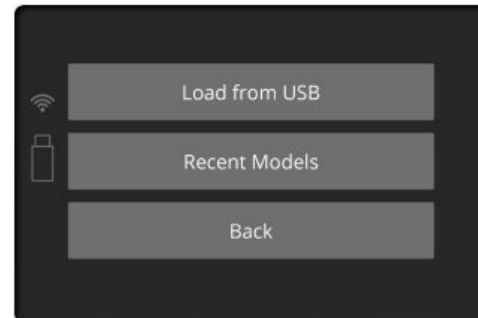


Image 19. Connecting a USB flash drive to the LISA PRO printer screen.



IMPORTANT!

After uploading the model on the printer's internal storage, printed projects can be chosen from RECENT MODELS.

3. Choose source. Titles of project files will be displayed. Displayed arrows will help to navigate through folders and files.
4. After choosing a file, it will be loaded into the device's memory.

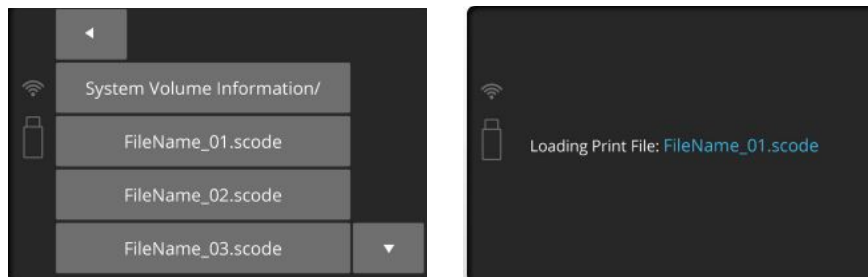


Image 20. Loading the print file screens.

5. After loading the file, the display will show basic informations such as: the file's name, material and expected printing time. The flash drive can be then safely removed (Image 15).
6. Software will allow you to return to previous section or proceed to the next. After choosing the next section, Sinterit LISA PRO will check whether it is ready to print.

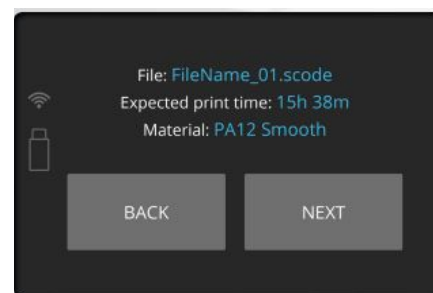


Image 21. Basic information after loading the file to the printer's screen.



WARNING!

Carefully read all messages displayed on the screen while preparing the machine for printing. Skipping the described operations may result in incorrect printing or machine failure.

First use of the printer

- a. If the machine is filled with powder for the first time, after loading the file, a message will appear that the laser glass needs to be cleaned. (Chapter 8, Section A).
- b. After confirming that the previous content (printouts and unsintered powder) of the PRINT BED has been removed and that the work space of the RECOATER is not obstructed, the printer will be ready for printing - it will start the printing process by repositioning the BEDs and the RECOATER.

Subsequent use of the printer

- a. After confirming that the previous content (printouts and unsintered powder) of the PRINT BED has been removed and that the work space of the RECOATER is not obstructed, the printer will be ready for printing - it will start the printing process by repositioning the BEDs and the RECOATER.

- 7. By clicking DONE the RECOATER and the BEDs will be repositioned. During this operation, the height of both BEDs is set in accordance with the currently selected printing process.

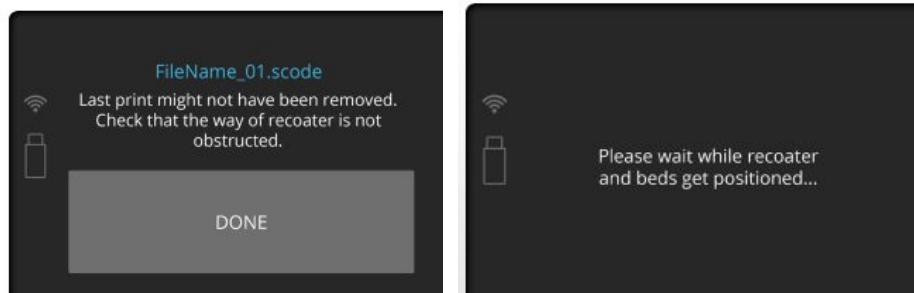


Image 22. Positioning of the BEDs and the RECOATER screens.

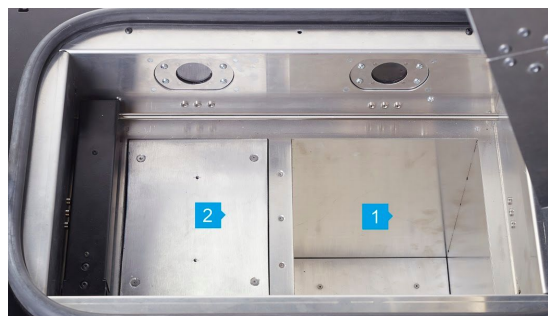


Image 23. Repositioned BEDs: PRINT BED (2) and ready to be filled with powder FEED BED (1) and the base position for the RECOATER.



	IMPORTANT!
	When working with powders always wear protective clothing (glasses, mask, gloves).
	For the first use of the Sinterit LISA PRO Printer use only the powder (for PA12 SMOOTH and PA11 ONYX) from the container labeled PRINT READY POWDER.
	Always pay attention to the messages displayed on the LCD screen of the Sinterit LISA PRO Printer.

8. After the BEDs repositioning process is finished, you will be asked to fill the FEED BED with powder. Compress the powder with a dedicated tool provided in the Accessory Box. To do this:

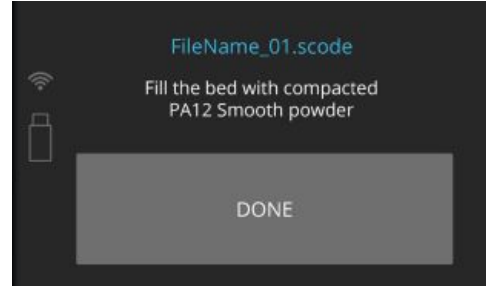


Image 24. Fill the FEED BED screen.

- add chosen powder (PA12/ PA11 PRINT READY POWDER or one from the TPU group) to the FEED BED, 10[l] of powder maximum. Fill the FEED BED with the powder and press it slowly, but decisively (using a trowel f.ex). Act carefully in order for the powder not to go airborne (it is recommended to use a spatula for adding the powder).
- It is also recommended to add a little bit of the chosen powder on the surface of the PRINT BED. This will make creating the first layer during positioning faster.

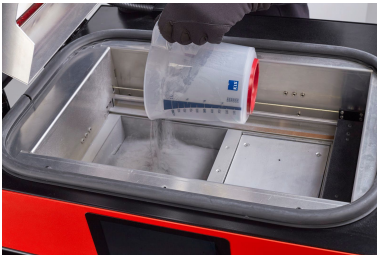


Image 25. Step 1. Adding powder to the FEED BED .



Image 26. Step 2. Compacting powder by gently pressing it.



Image 27. Step 3. Equal distribution of powder on both BEDs

9. To perform the leveling of the powder inside the printer click the START LEVELING button.

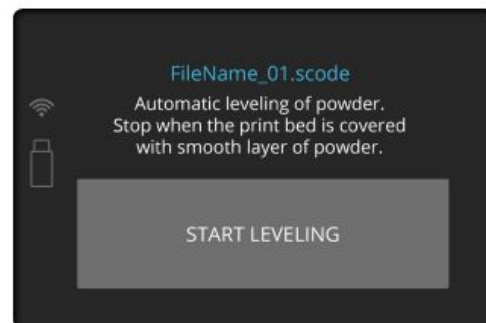


Image 28. START LEVELING screen.



10. Once both BEDs are covered with a smooth layer of powder, press LEVELING DONE on the LCD screen.
11. The RECOATER will return to its default position.

The operation may complete quicker: whenever the powder uniformly covers the PRINT BED surface you can press STOPPING .

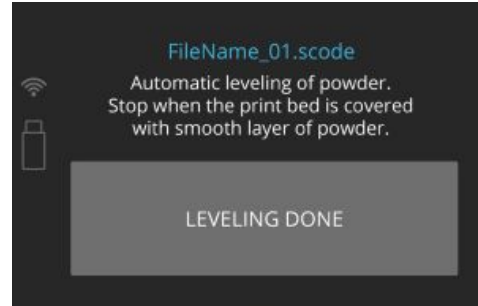


Image 29. LEVELING DONE screen.

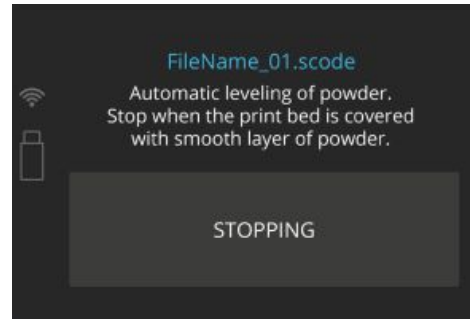


Image 30. Stopping the leveling process manually screen.

12. When the levelling is done and the RECOATER has returned to its default position, the cleaning process must be initiated.

- Use a wipe soaked with alcohol (ethanol or salicylic alcohol 2%) to very carefully clean the vision windows of the camera and pyrometers.
- Clean the infrared heaters (white and red ones) by gently blowing on them with clean compressed air.

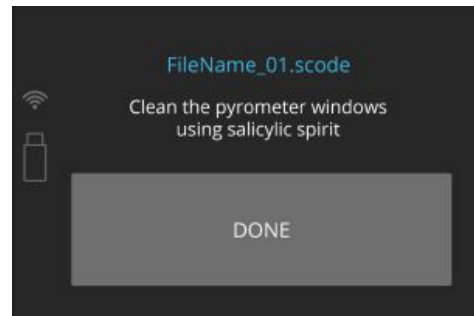


Image 31. Clean the pyrometer screen.

13. Ensure that no tools or previous printouts are left in the printing chamber.
14. Clean any excess powder from the area around the BEDs, the guide bar and the wire of the RECOATER, using a paint brush.
15. Lubricate the plain bearing of the RECOATER with the included silicone grease.
16. Press DONE and gently close the Lid.

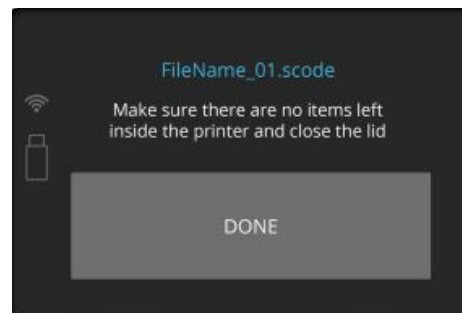


Image 32. Finalizing preparations for printing.

	<p>IMPORTANT! If quality of distributed powder is unsatisfying, close upper lid and press BACK button. Unlock Lid and start the Leveling procedure/process again.</p>
--	--



17. Press START PRINTING button on the LISA PRO display and the printing process will start.
18. Upon confirmation, the progress of printing process will appear on the screen.

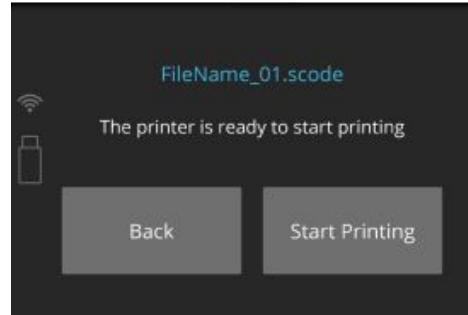


Image 33. Start printing screen.

B. Information and tasks while printing

1. The main screen of the graphical user interface displays in real time the status of the print, current temperature of the BEDs, warming and cooling states, and the remaining time of laser sintering.
2. Clicking on the CAMERA button activates the internal camera view, which will be displayed for 10 seconds. After that the display will return to the main screen.
3. During printing, if visible problems appear, observed by the means of the internal camera or the top vision window, the user can fine tune the temperature (TEMP +/- 5 [°C]).

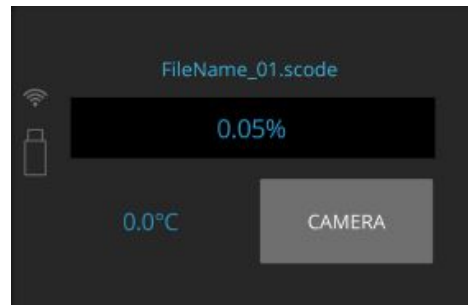
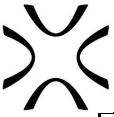


Image 34. The main screen during printing.



Temperature management suggestions:

- The possibility to adjust the temperature is provided directly in Sinterit LISA PRO Printer in TEMP tab or in the Sinterit STUDIO 2019 software suit.
- On the machine, this option is depicted by means of + and – buttons which increase or decrease the temperature by 0.5 [°C] (maximum extent +/- 5 [°C]). In Sinterit STUDIO 2019, this option is depicted by means of PRINT SURFACE TEMPERATURE Offset drop-down menu [°C].
- These options are used to increase the level of cake welding (printouts more straight but less detailed) or to decrease the level of cake welding (cake becomes more powdery, it is easier to clean it up but printouts can be distorted; printout details have better quality).
- Another calibration option is to change the laser power. This change is only possible on the level of Sinterit STUDIO 2019. In the program menu, it can be found as LASER POWER RATIO (1.0 by default).



	<ul style="list-style-type: none">• The laser intensity is raised by increasing the value by 0.01, and lowered by decreasing (also by 0.01). The acceptable calibration scope of laser multiplier is 0.5-3.0.• As the laser gets weaker, the printout durability get lower as well, however the quality of details gets better. Similarly: an increase of laser power strengthens the printout but weakens the quality of details. <p>These remarks apply to the material PA12 SMOOTH and PA11 ONYX. In case of FLEXA materials, an increase in laser power results in a printout stiffening (up to a certain, maximum level).</p>
--	---

	ATTENTION! Do not lower the temperature inside too quickly. The permissible standard is 0.5 [°C] on one layer.
--	--

	WARNING! During printing, if smoke, irritating smell or other alarming circumstances take place, press the safety button . It will immediately cut off the power from the printer. However, remember that it is impossible to open the printer (e.g.: by lifting the lid), until the temperature inside will not drop below 50 [°C] and the UNLOCK LID option becomes available. While the printer is working do not touch any other elements besides: the LCD, the safety button, the USB port and the power switch.
--	--

C. Using the nitrogen chamber

 	CAUTION! Possibility of unsealing - gas has a suffocating effect on people by displacing oxygen from the air. Too low oxygen concentration in the air can lead to unconsciousness and death . Inhalation exposure may cause short breath, breathing difficulties, headaches and dizziness, with high concentrations of gas disorders of orientation, nausea, fainting, loss of consciousness, death. Store in a well-ventilated place. Do not inhale gas. Nitrogen is an inert gas, a natural component of atmospheric air. It is not harmful in the aquatic environment or soil, its adverse effect is limited to the displacement of oxygen.
----------	---

- A. To print in the nitrogen environment (required for PA11 Onyx), connect the nitrogen supply to the gas connection (1). It can be connected at anytime, even when the printer is off, as it has an electrovalve built in.



Image 35. Nitrogen input.

- B. Make sure that the nitrogen pressure is between 4 and 8 [bar] during the whole process. Remember that it may change if you're using a bottle and a pressure regulator.
- C. Start the printing process as usual (Chapter 9). If the .scode file is properly prepared, the printer will automatically control the use of the nitrogen chamber.

D. Finishing the print

When the process will be finished, the information of possibility to remove printout will be displayed.

- By clicking REMOVE PRINT the PRINT BED will raise, enabling the printout to be taken out from the chamber.
- By clicking BACK the system will return to the first screen.

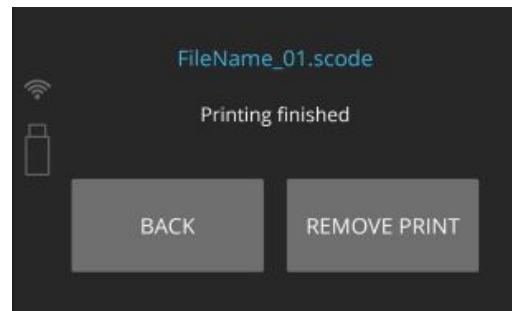


Image 36. Printing finished screen.

1. When the printing is complete and the print has cooled down message YOU CAN NOW REMOVE THE PRINT FROM PRINTER will appear on the screen. Click DONE to complete the printing process and open the printer.

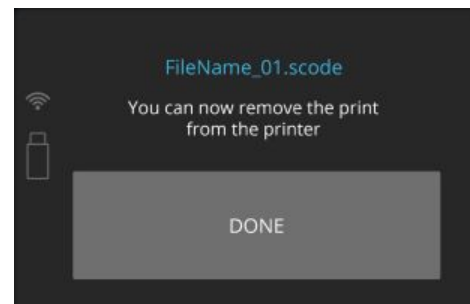


Image 37. Printing finished screen.



IMPORTANT!

The blockade of the device is engaged up until the internal temperature will not drop below 50 [°C].

There is no possibility to open the lid before the temperature drops.

Remember that the print inside the printer may still be hot, despite the fact that the printer has cooled down!

2. In order to open the printer, unlock the magnetic lock on the lid. The lock releases the blockade for 10 seconds. After 10 seconds the lock will become active again.
3. Softly press the lid and then lift it by pulling up.



IMPORTANT!

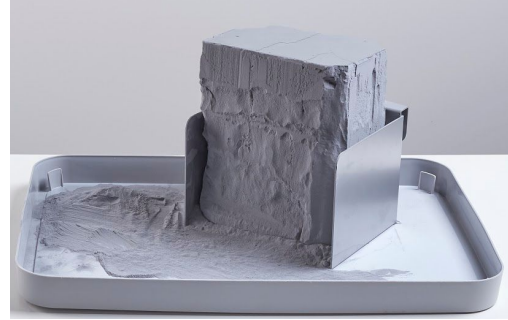
Put on the safety clothing included in the set (mask, glasses, gloves).



Image 38. A correct condition of the powder after printing (visible cracks on the surfaces of both BEDs).

4. Using the provided 2 parts kit of plates, carefully transfer the entire content of the PRINT BED to the plate for carrying the prints, and transfer it to the mold included in the set. Leave the cuboid with the print to cool down, for at least one hour (see images 39).





Images 39. A correct way of taking out the prints from the PRINT BED.

5. Remove the powder from the OVERFLOW BIN.
6. Transfer it to the container in which you will mix the powder from the printer, with the FRESH POWDER later (to refresh the used powder and prepare it for the next print).
7. Place the OVERFLOW BIN back in its place.
8. After the PRINT BED is ready to remove the printout, the information about refreshing of the remaining powder will appear. The quantity of FRESH POWDER (for PA11, PA12 and TPE) needed to be add for the next print will be displayed on the screen.
9. Next the system will guide you through printer cleaning process. It will allow you to recover, all remaining powder.

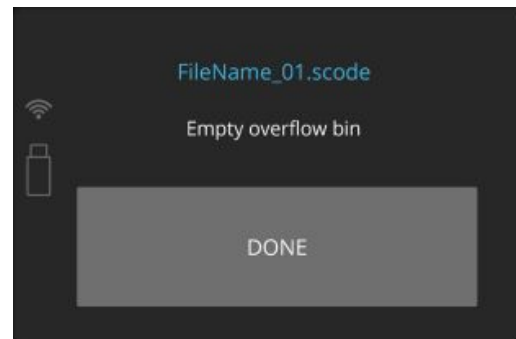


Image 40. OVERFLOW BIN cleaning screen.



Image 41. Correct cleaning of the OVERFLOW BIN.



	<p>IMPORTANT!</p> <ul style="list-style-type: none">• Always pay attention to the messages displayed on the main display of the Sinterit LISA PRO printer. The Sinterit STUDIO 2019 software calculates the amount of FRESH POWDER, which needs to be added to that already inside of the printer. Not acting according to the messages may result in the following print being incorrect.• Even if you do not intend to make the following print right after the first one, mix both powders in the proportions given by the Sinterit STUDIO 2019 software. Store in the container for the PRINT READY POWDER.
--	---

E. Cleaning the printer

The system will guide you through printer cleaning process when you will proceed straight after printing. You can also do it later using CLEAN PRINTER option displayed in main menu. All actions should be confirmed by pressing the DONE button.

1. Remove the powder from the OVERFLOW BIN.
2. Transfer it to the container in which you will mix the powder from the printer, with the FRESH POWDER later (to refresh the used powder and prepare it for the next print).
3. Remove and clean the LASER PROTECTIVE GLASS. It is recommended to clean the glass before and after each print:
 - a. in order to clean the glass, follow the instructions in the chapter “Maintenance and service of the Sinterit LISA PRO Printer”
 - b. Place the glass back then confirm all actions by pressing the DONE button.

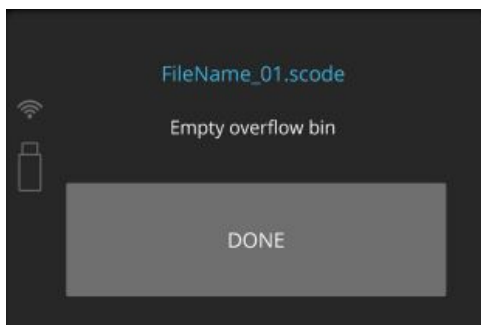


Image 42. OVERFLOW BIN cleaning screen.Step 1.

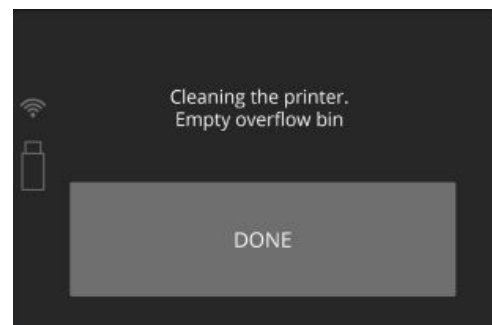


Image 43. OVERFLOW BIN cleaning screen . Step 2.

	<p>STOP!</p> <ul style="list-style-type: none">• Watch out for the elements of the heating system of the machine.• Do not clean the glass under running water.• The cleaning process should be carried out outside of the machine.
--	---



4. A message FEED BED MIGHT NOT HAVE BEEN CLEANED AFTER LAST PRINT will appear.
5. Cleaning the FEED BED should be confirmed by pressing CLEAN FEED BED button. The FEED BED will be raised and the PRINT BED will be lowered.
6. All remaining powder from FEED BED should be placed into PRINT BED. Precisely clean the FEED BED from the remaining unsintered powder including the BEDs surroundings. This can be done with the use of a spatula. SKIP button can be pressed if cleaning process had been previously done.

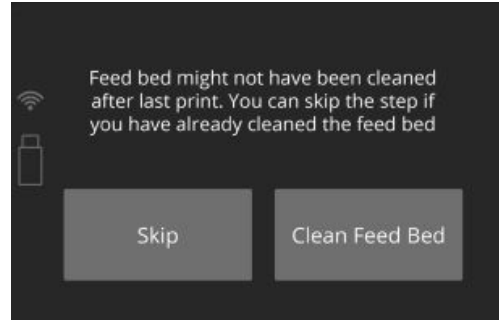


Image 44. Clean FEED BED screen.



Image 45. Removing the powder from the FEED BED.

7. Ensure that the movement path of the RECOATER is not obstructed and remove all objects from the printer chamber.
8. Check if all elements are at their default positions (RECOATER, LASER). Check the tension and condition of the RECOATER's BELT. Confirm by clicking DONE button.

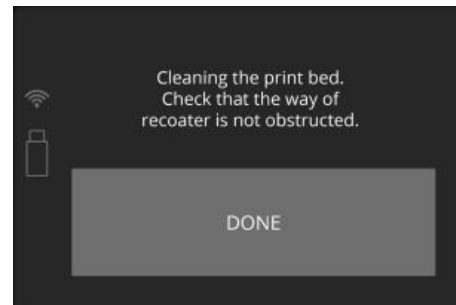


Image 46. Clean PRINT BED screen 1.



STOP!

For cleaning the guide bar of the RECOATER , it is recommended to use a paintbrush with a soft bristle (included in the set), or compressed air (when there is no powder inside the printer). After cleaning, the guide bar of the RECOATER should be lubricated with silicone oil (included in the accessory kit).



9. A message PRINT BED MIGHT NOT HAVE BEEN CLEANED AFTER LAST PRINT will appear. All remaining powder from print chamber should be removed.

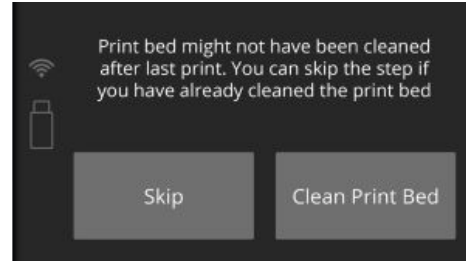


Image 47. Clean PRINT BED screen 2.

10. All remaining powder from PRINT BED should be placed into the OVERFLOW BIN gap. Precisely clean the PRINT BED from the remaining unsintered powder including the BEDs surroundings. This can be done with the use of a spatula.



Image 48. Removing powder from PRINT BED to OVERFLOW BIN.

11. Ensure that the movement path of the RECOATER is not obstructed one more time and remove all objects from the print chamber. Confirm by clicking DONE button. After cleaning operations are finished, confirm by clicking DONE.

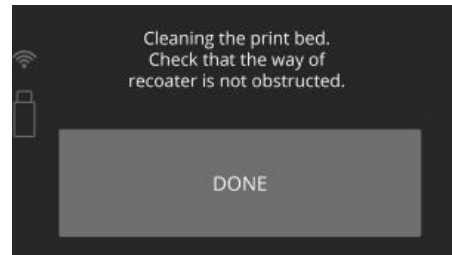


Image 49. Clean PRINT BED screen 3.

12. Dutifully clean all the remaining unsintered powder from the surroundings. All remaining powder should be placed into OVERFLOW BIN gap. Confirm operation by clicking DONE.

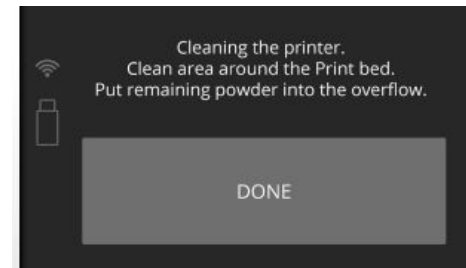


Image 50. Clean PRINT BED screen 4.

13. Remove the powder from the OVERFLOW BIN. Transfer it to the container in which you will mix the powder from the printer, with the FRESH POWDER later (to refresh the used powder and prepare it for the next print).

14. Place the OVERFLOW BIN. back in its place.

15. Confirm operation by clicking DONE and close the lid.

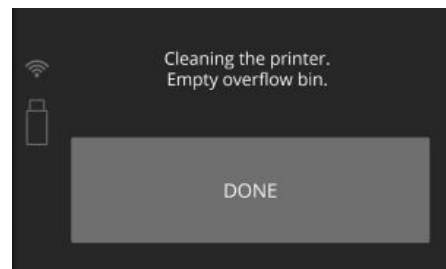


Image 51. Clean OVERFLOW BIN screen.



CAUTION!
Beware of sharp edges.





10. Cleaning the prints

1. By using a brush with a nylon bristle, initially clean the print of any unsintered powder, until an outline of the print is visible. If the mass is still warm, leave it to cool down.
2. Separate the prints from the mass and continue to clean them with the nylon brush included in the set. Mash up the clumps of powder remaining in the form (this will help to sift the remaining powder through the sieve).



Image 52. Cleaning the prints.

3. After an initial cleaning, a **SANDBLASTER** (available at Sinterit online store) may be used to clean the print details.



Image 53. Sinterit SANDBLASTER.

4. Combine the unsintered powder from the **PRINT BED** with the powder remaining in the **FEED BED** and **OVERFLOW BIN**. Sift the entire unsintered powder through a sieve (included in the set) or use Sinterit **POWDER SIEVE** available at Sinterit online store.



Image 54. Sieving the powder using Sinterit POWDER SIEVE.



5. We recommend sieve powder because in SLS technique powder is 100% reusable. Some materials - with 0% refreshing ratio like FLEXA powder group - you can reuse without sieving and refreshing, straight after printing.

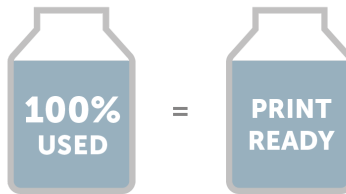


Image 55. New PRINT READY POWDER for FLEXA group. No need to add FRESH POWDER.

6. Others, like high temperature powders from PA group - needs to refresh properties lost during last sintering process. To do it just add to USED POWDER the FRESH powder in proportions indicated by the software.



Image 56. The method of combining PA12 with refreshing ratio 30% after the printing.

A. Painting and lacquering

- SLS parts are able to be spray painted and/or coated with a lacquer (varnish or clear coat). Via lacquering it is possible to obtain various finishes, such as high gloss or metallic sheen.
- Lacquer coatings can also improve wear resistance, surface hardness, water-tightness and limit marks and smudges on the surface of the part.
- Due to the porous nature of SLS it is recommended that 4- 5 very thin coats are applied to achieve a final finish rather than one thick coat.
- This results in faster drying time and reduces the likelihood of the point or lacquer running.



11. Maintenance and service of the Sinterit LISA PRO Printer

To maintain the most efficient and long-lasting Printer, ensure regular conservation. The basic maintenance contains:

- cleaning the PYROMETERS and the CAMERA PROTECTIVE GLASSES before and after each print;
- checking the status of the RECOATER TRANSMISSION CABLE;
- cleaning the LASER PROTECTIVE GLASS before and after every print;
- cleaning the surface under the BEDs after every third print;
- lubricating the RECOATER's ball bearings.

A. LASER PROTECTIVE GLASS - replacement

1. Turn of the safety key switch and turn off the power switch.
2. While holding the heater module, take out the split pin positioned on the top of the inner part of the lid.
3. Lower the heating module to get access to the place dedicated for the LASER PROTECTIVE GLASS.
4. Unscrew two knurled nuts from the LASER PROTECTIVE GLASS module.
5. Remove the module from the locking holders located in the middle of the lid.
6. Now you can replace module of LASER PROTECTIVE GLASS with the new one.

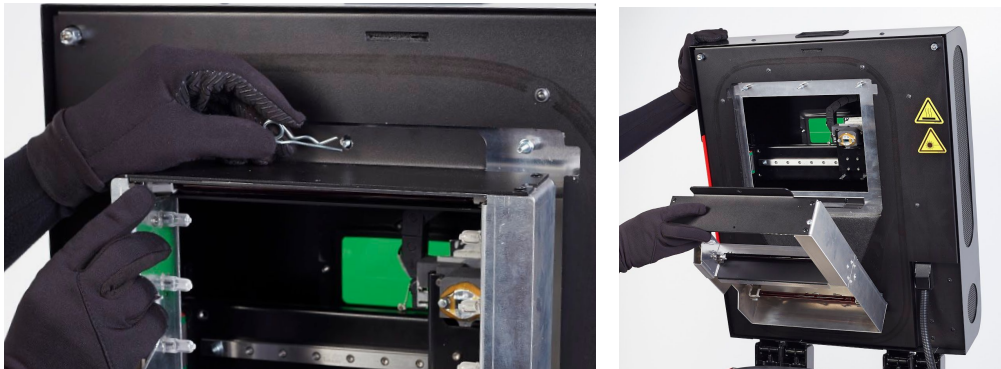


Image 57. HEATER MODULE - clasp system.



CAUTION!

Beware of sharp edges. Put on the safety gloves to protect yourself from injuring the hand against the side of the heating module.

To assemble the LASER PROTECTIVE GLASS socket:

7. Slide the metal tabs of the LASER PROTECTIVE GLASS module into the holders located in the middle of the lid.



8. Press the module gently to the lid. After obtaining the perfect fit, screw the knurled nuts on to the visible screws.
9. Join the heating module with the lid - using the metal split pin.
10. Clean the glass one more time from any finger marks or stains if present.



Image 58. Correct placement of the LASER PROTECTIVE GLASS on the HEATER MODULE.

B. Cleaning the LASER PROTECTIVE GLASS

To clean the LASER PROTECTIVE GLASS you need to take it out, according to steps 1-5 in the chapter 11. A (above).

1. Put the glass on a stable and clean surface.
2. Rub the surface of glass carefully with a cotton cloth soaked with 2% salicylic acid (ethanol solution) or any other ethanol-based solution. Do not use isopropyl alcohol! Pay attention to any fibers left on the surface. Clean both sides.
3. After the cleaning, put the glass back into the metal frame. To assemble the laser glass follow instructions 7-10 from chapter 1. A (above).

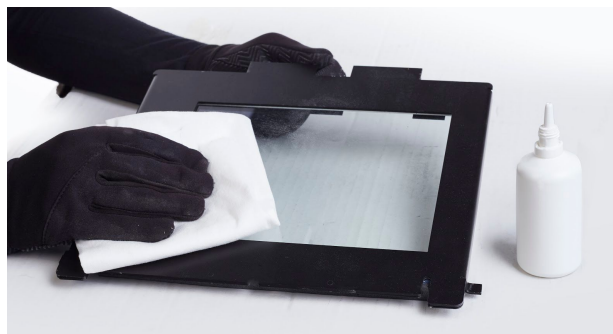


Image 59. Cleaning of laser protection glass.



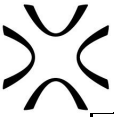
ATTENTION!

Before cleaning, turn the printer off.



STOP!

- Watch out for the elements of the heating system of the machine.
- Do not clean the glass under running water.



- The cleaning process should be carried out outside of the machine.

C. Cleaning the surface under the BEDs



ATTENTION!

Before cleaning, turn the printer off.



CAUTION!

Beware of moving parts which can crush hands.
Pay attention to the indications inside!

To facilitate cleaning of the space under the BEDs, Sinterit reinvented the front panel assembly. Now under the panel, you will find the magnetic fasteners which allow you to remove it fast and simple.

You will find a hollow to easily put your fingers - which will make it quicker for you to remove it.



Image 60. The magnetic fasteners.

1. Lift up the panel gently, unfastening each clip one after another.
2. After removing, put the panel on a flat, safe surface.
3. Gently remove the powder using a brush, or special vacuum cleaner, minding the Beds engines.
4. **To install** the panel, perform the above actions in reverse order.



Image 61. Method of taking off the front panel.



D. Replacement of INFRARED HEATING UNITS placed around the LASER PROTECTIVE GLASS

1. Wear protective gloves or use a clean cloth / paper towel while replacing the HEATING UNITS. Do not touch the heaters with your hands.
2. Make sure the heaters are not hot. Carry the operation out when the machine is cold and switched off.
3. Gently grab the heater with your fingers and remove it parallel to its slots. Do not twist it in any direction, it may cause damage to the heater's slots.
4. Insert the new heater to the slot.



Image 62. Correct removal of the old and installing the new INFRARED HEATERS.



IMPORTANT!

If you will touch heater by your hand, remove it, clean it and install one more time, using gloves or a clean cloth.

E. Changing the RECOATER BELT

1. Clean the printer's chambers (FEED BED and PRINT BED).
2. Go to ADVANCED MODE.
3. Move the RECOATER left to the position between the FEED BED and PRINT BED (MECHANICS // RECOATER // ◀) in order to have access to the screws holding the RECOATER 's cover (on the right side of the RECOATER).
4. Dismantle the casing (the black element on the RECOATER):
 - a. clean any possible remains of the powder from the insides of the screws (for example using the chisel included in the set or some other sharp tool),
 - b. using a size 2 hex key (ISO 2936:2014) unscrew two screws (M3x8),
 - c. carefully take out the cover and lay it aside together with the screws.
5. Using a size 2.5 hex key unscrew (M4x6) and gently dismantle the belt's tensioner located on the RECOATER , just above the belt.
6. Carefully take out the tensioner from the printer housing.
7. Unscrew the plate located on the left end of recoater's belt (M3x8, size 2 hex key) and gently pull the ending out of the hole.





8. Unscrew the second plate holding the belt (on the right side of the printer) and pull the ending out of the hole.
9. Take the right ending of the belt and gently reeve, first the plate, then the ending, through the gap between the roller and RECOATER's housing to the left side. You should then be able to take the belt out of the printer.



IMPORTANT!

Be careful! The left side of the belt is ended with a spring, which is located inside the printer's housing.

10. Prepare the new RECOATER 's BELT. The new belt should always be mounted with its brown side up.
11. Place the ending with the spring in the hole on the left side and screw the plate with two M3x8 screws.
12. Reeve the second ending and the plate through the gap between the roller and RECOATER 's housing to the right.
13. Screw the plate on the right side of the printer.
14. Mount and screw the tensioner (M4x6).
15. When mounted properly, the belt should touch the corrugated part of the roller.
16. Check the new belt's tension. It shouldn't be loose.
17. Place back and screw the RECOATER 's cover.

NOTE: If at point 4 your screwdriver is not short enough, you can move the RECOATER using on-screen buttons to unscrew/screw the screws comfortably.



CAUTION!

Beware of moving parts which can snag and pull.

F. Nitrogen chamber - ongoing maintenance



CAUTION!

Possibility of unsealing - gas has a suffocating effect on people by displacing oxygen from the air. Too low oxygen concentration in the air can lead to **unconsciousness and death**. Inhalation exposure may cause short breath, breathing difficulties, headaches and dizziness, with high concentrations of gas disorders of orientation, nausea, fainting, loss of consciousness, death.



Store in a well-ventilated place. Do not inhale gas. Nitrogen is an inert gas, a natural component of atmospheric air. It is not harmful in the aquatic environment or soil, its adverse effect is limited to the displacement of oxygen.





1. If the nitrogen pressure becomes too high or too low, an intermittent sound signal is activated.
2. If the concentration of oxygen in the printer's surroundings is too low, a continuous sound signal is activated.
3. If the oxygen level in the printer's surroundings drops below 19%, the device stops printing and displays a message to close the nitrogen supply.
4. If the nitrogen pressure is too low, connect a proper nitrogen supply or the printing will stop in 3 minutes.
5. If the nitrogen pressure is too high, a notification is displayed.

	<p>WARNING!</p> <p>The built-in oxygen level detector is not a certified device and the signal cannot be treated as the only warning. Keep the LISA PRO printer and the nitrogen bottle in well ventilated rooms.</p> <p>If you hear an alert, open the windows/ventilate the room and leave the room.</p> <p>If you feel any suspicious symptoms, immediately leave the room and go outside/to a well ventilated room.</p>
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G. Technical support

The latest information, technical support, and versions of the manual are available in the Support tab of the Sinterit Sp.z.o.o. company website or by contacting us through email: contact@sinterit.com or phone: +48 570 967 860.




The list of distributors and technical support in specific countries can be found at www.sinterit.com.




12. Working processes with the materials


A. Supplies information

When working with the polyamide powder or other designated printer powder for the Sinterit LISA PRO Printer, always wear protective kit attached to the above-mentioned device (glasses, gloves, dust mask).

  	<p>WARNING! When working with a polyamide powder, avoid inhalation or swallowing and contact with skin and eyes.</p> <ul style="list-style-type: none">• If the PA powder is inhaled, move to a place with fresh air and gargle thoroughly with plenty of water. If coughing develops, contact a physician.• If you eat a PA powder, rinse your mouth with water and drink 1-3 glasses of water to dilute stomach contents. If necessary, contact your doctor.• If the PA powder gets in your eyes, rinse them thoroughly with water. In case of persisting eye irritation, contact a physician.• When the PA powder gets in contact to your skin, wash it with soap and water.
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- Polyamide powder should be stored in tightly closed containers, in a room at room temperature and low humidity.
- Powder should be stored out of reach of children and pets.
- If the device is not used for a long time, the powder should be stored in a sealed package.
- When printing the smell of burning material may be emitted in intensities which do not affect the health of users. However, in the case of long-term operation of the printer in a poorly ventilated room, the smell may become unpleasant and irritating. Adequate ventilation is recommended in order to create the best printing conditions.

	<p>WARNING! Do not attempt to burn/melt polyamide powder. The resulting sparks and hot mass can cause severe burns. Keep the polyamide powder away from fire.</p>
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	<p>STOP! Do not dispose in municipal waste! The used polyamide powder should be stored in sealed containers and disposed in accordance with local policy of waste plastic material.</p>
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B. Materials for nitrogen use

The only material in our offer that requires using the nitrogen chamber during the printing process is **PA11 ONYX**. Its full characteristics is available at www.sinterit.com/pa11-onyx. The nitrogen chamber can be also used with 3rd party materials if you own Sinterit STUDIO 2019 version with open parameters feature (Sinterit STUDIO OPEN or Sinterit STUDIO ADVANCED).

C. Materials in the Sinterit Lisa Printer

PA12 SMOOTH

- When printing using PA12 SMOOTH, the printer may become hot. Be careful and do not harm yourself.
- During the printing process, you may watch the objects building through the top glass.
- After printing, the block in the PRINT BED is very firm, but also very powdery (all of the unsintered powder falls down even when lightly shaken).
- Prints made from PA12 SMOOTH may take some time and effort to clean them from the unsintered powder. Please clean them with the tools included in the set. As you do so, next we recommend using a sandblaster or compressed air to clean areas difficult to reach.
- Due to high temperatures, the material ageing process (degradation) occurs – there is a need to add FRESH POWDER to the used one (from the printer, OVERFLOW BIN and the one remaining from model cleansing). The used one must be sifted through a sieve, then the fresh batch of powder must be added and the compound must be blended together.

FLEXA group and TPE

- When printing using FLEXA or TPE, smoke from the melted material may appear inside the printer.
- Due to a lower melting temperature, the visibility through the window and the camera, is limited (the INFRARED HEATERS working with lower power do not produce enough light).
- For FLEXA group, after printing, the block in the PRINT BED is very firm, but also very powdery (all of the unsintered powder falls down even when lightly shaken).
- Prints made from FLEXA group (unlike those from PA group) may be easily cleaned, using for example a paint brush (the brushes included in the set do not have to be used). We recommend using a sandblaster or compressed air to clean areas difficult to reach.
- FLEXA does not require refreshing – there is no need of adding new powder to the one from the printer (unlike with the PA group). After sifting through a sieve, the entire powder is ready to be reused.




D. Cleaning the machine and changing the powder

1) Material with higher melting point (H) -> Material with lower melting point (L)

When changing from **H** to **L**, no dutiful cleaning of the inside of the printer is required. The same actions as cleaning the machine after printing should be carried out.

2) Material with lower melting point (L) -> Material with higher melting point (H)

- When changing **L** to **H** it is required to clean the machine very precisely. Special attention should be paid on the bottom and side walls of the print and FEED BED's as well as the RECOATER's guide bar. It is also recommended to clean the area around the BEDs using compressed air. Disassemble the RECOATER's casing and remove the remaining powder. It is important to clean the printer as thoroughly as possible before adding **H**; otherwise, the remaining **L** (e.g. FLEXA with its properties similar to rubber, becoming liquid in temperatures above 100[°C]) may get into the mechanism responsible for moving the BEDs or the RECOATER's mechanism, and damage the machine.
- Clean the LASER PROTECTION GLASS as some fumes may release during printing with FLEXA and make the glass foggy. If it is hard to clean the surface, you can use ethyl acetate.

	<p>WARNING!</p> <p>Important messages will be displayed in Sinterit STUDIO 2019, not abiding with which may result in damaging the print and/or the printer. Similar messages will appear on the display of Sinterit LISA PRO Printer. Please read them carefully in case of changing the powder from the ones with lower melting point to those with higher melting point (especially FLEXA or TPE to PA12 or PA11).</p>
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The thorough cleaning procedure must be performed if you switch from any material with higher melting point to a material that melts at lower temperature.

Powder type	PA12 Smooth	PA11 Onyx	Flexa Grey	Flexa Black	Flexa Soft	Flexa Bright	TPE
Melting point	182°C	201°C	160°C	160°C	150°C	160°C	190°C

13. General legal information

Where this manual refers to Sinterit or the Company, this means Sinterit sp. z o.o. with its legal seat in Krakow, registered by the District Court for Kraków-Śródmieście in Cracow, XI Commercial Division of the National Court Register under number: 535095, NIP (tax number): 6793106416, with the share capital for a date of publication of this manual of PLN 78,700 (say: seventy eight thousand seven hundred).

This document contains material protected under copyright and industrial property laws. This means that the document may not be, including but not limited to, reproduced or modified without the consent of Sinterit.



This manual serves to assist in the correct use of the device, perform basic maintenance and, if necessary, to solve simple problems, allowing to maintain the device in a good condition.

This manual contains content exclusively for the provision of information and the use by individuals professionally trained and engaged in the operation and maintenance of the equipment described below.

The information contained in this document is intended for use only with the product made by Sinterit and called Sinterit LISA PRO.

Due to the constant development of Sinterit's products the information contained in this manual, specifications and markings are subject to change without notice.

14. Disclaimer

Sinterit is not responsible for any use of this information in relation to other products.

Sinterit is not liable for any damages, including but not limited to losses or lost profits, resulting from the use of any materials (consumables) other than those provided to the purchaser by Sinterit.

Sinterit is not liable to the purchaser of the product or any third party for any damages, including but not limited to losses or lost profits resulting from improper use of the product, particularly not in accordance with this manual, or modifications or repairs unauthorised by Sinterit or improper maintenance.

Although every effort has been taken to provide accurate information about the product, Sinterit assumes no responsibility for any incorrect information or omission. Sinterit reserves the right to correct any errors and disclaims any liability in situations resulting from these errors.

Sinterit shall not be liable for defects in the Printer's firmware.

Further limitations or exclusions of Sinterit's liability may result from the applicable laws or agreements entered into with the purchaser of the products.

15. Trademarks

SINTERIT name and logo, as well as Sinterit LISA PRO name are registered trademarks of the Company (or necessary motions have been filled to register the trademarks).

16. Software license agreement

Sinterit grants the buyer a non-transferable license without a right to sublicensing to use the control software Sinterit STUDIO 2019 under the terms and conditions set forth in agreement between the buyer of Sinterit LISA PRO Printer and the Company.

17. Terms of warranty

The terms of warranty granted by Sinterit to its direct clients are set forth in the agreement between the client and the Company. Sinterit's warranty is nominative.



In case of purchase made in the Sinterit online shop, the terms of the warranty are specified in the Terms and Conditions, that have to be accepted by a client before placing an order.

In case of purchase made outside the Sinterit online store, the warranty terms may be specified in the offer or in another form chosen by the Company to provide a customer with relevant information before making a purchase decision.

Sinterit's warranty does not cover including but not limited to:


- damages, abnormalities or malfunction caused by a client or any third party,
- damages, abnormalities or malfunction caused by inappropriate use, effects of force, insufficient or inappropriate maintenance, abnormal operating conditions, incorrect installation or inadequate servicing,
- normal wear and tear, including but not limited to replaceable infrared heaters, laser`s protection glass, recoater`s transmission cable – short, recoater`s plain rotary bearings, recoater`s plain linear bearing,
- damages, abnormalities or malfunction caused by dismantling, alterations, tuning or other changes of product by a client or any third party made without a written consent of Sinterit,
- damages, abnormalities or malfunction caused by or related to use of consumables other than those being supplied by Sinterit,
- damages, abnormalities or malfunction caused by or related to use of product against instructions/manuals or safety regulations,
- damages, abnormalities or malfunction caused by incompatibility of client software and Sinterit software or for any malware,
- damages or abnormalities Sinterit is not liable for, according to the applicable law,
- damages exceeding the price paid by the client,
- costs incurred by the client in connection with conclusion of the product sale agreement as well as storage and/or insurance of products,
- damages of property caused by the defect of the product,
- loss of profits,
- incidental, indirect, consequential damages.

The abovementioned exclusions of warranty apply as well to any other liability of Sinterit, to the widest extent permitted by the applicable law.

Terms of liability of sellers others than Sinterit as distributor or resellers shall be regulated by them in separate documents.

18. Packaging / repackaging guide

Recommended packaging technique in case the product has to be returned or repaired.

	<p>Attention! Sinterit LISA PRO Printer is a fragile machine and must be protected against damage during transport.</p>
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A. Preparing of the machine:

1. Remove the key and press the safety button. Remove the power cord.
2. Remove the LASER's PROTECTION GLASS and wrap it in a bubble wrap. Put the glass in a box outside the machine.
3. Place the bubble wrap in the upper flap to secure the laser module and close the printer's lead.
4. Manually move the RECOATER to the center of the print chamber and secure it with a bubble wrap (the foil should be on the PRINT and FEED BEDS).
5. Be careful not to apply too much foil, and not to damage the infrared heaters in the flap when closing.
6. Close the machine.



Attention!

Repack the product in the original manufacturer's packaging, complete with the inner cushioning material.

B. Packaging:

1. Remove the printer's front panel and place it on a flat surface.
2. Insert the bubble wrap gently into the gas chamber, watch out for the wires. Close the chamber.
3. Carefully insert the printer into the flight case.
4. Put the front panel under the lid of the flight case and close the case.
5. Wrap the entire case with stretch foil.
6. Mark the top of the package, stick "Fragile" stickers on it.



Attention!

If the product has been shipped on a pallet or in a flight case package, it should be returned in the same way.

C. Packaging if the original packaging is no longer available or damaged:

1. Wrap the LISA PRO Printer in multiple layers of bubble wrap so that a cushioning layer with at least 6[cm] of thickness protects the item.
2. Source a strong outer box which is at least 14[cm] larger than Sinterit LISA PRO Printer in all dimensions. This box should be strong enough to protect the printer. We suggest a dual-wall box.
3. Place 6[cm] of filler material (wrinkled wrapping paper or polystyrene foam) on the base of the outer box before placing the Sinterit LISA PRO Printer (wrapped in bubble wrap) inside.
4. Make sure the printer sits straight and the flap facing up!
5. Place the LISA PRO Printer inside the outer box or flight case - centred.





6. Fill (wrinkled wrapping paper or polystyrene foam) all available space for best results.
7. Close and seal the box by H-taping with pressure sensitive tape.
8. Secure the package with straps so that it does not move on the pallet.
9. Seal the whole package by stretch.
10. Mark where the top of the machine is.
11. Mark that package is "fragile".

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