

TRAK® 3ntr 3D Printers

Using the Materials Profile Wizard: Procedure/Instructions

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Covers Current Models:

- 3ntr A2
- 3ntr A4

TRAK MACHINE
TOOLS



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1.0 Introduction

The Materials Profile Wizard is used when a new print material is to be used, but there is no existing standard/reference material profile to use as a starting point.

Since there are a wide range of standard/reference material profiles that can be used as-is or used as a starting point for editing/customizing the parameters, using the material wizard as part of a print project is typically reserved for new, different, and/or highly specialized materials that have never been printed before.

1.1 Things to Consider Before Using New Materials

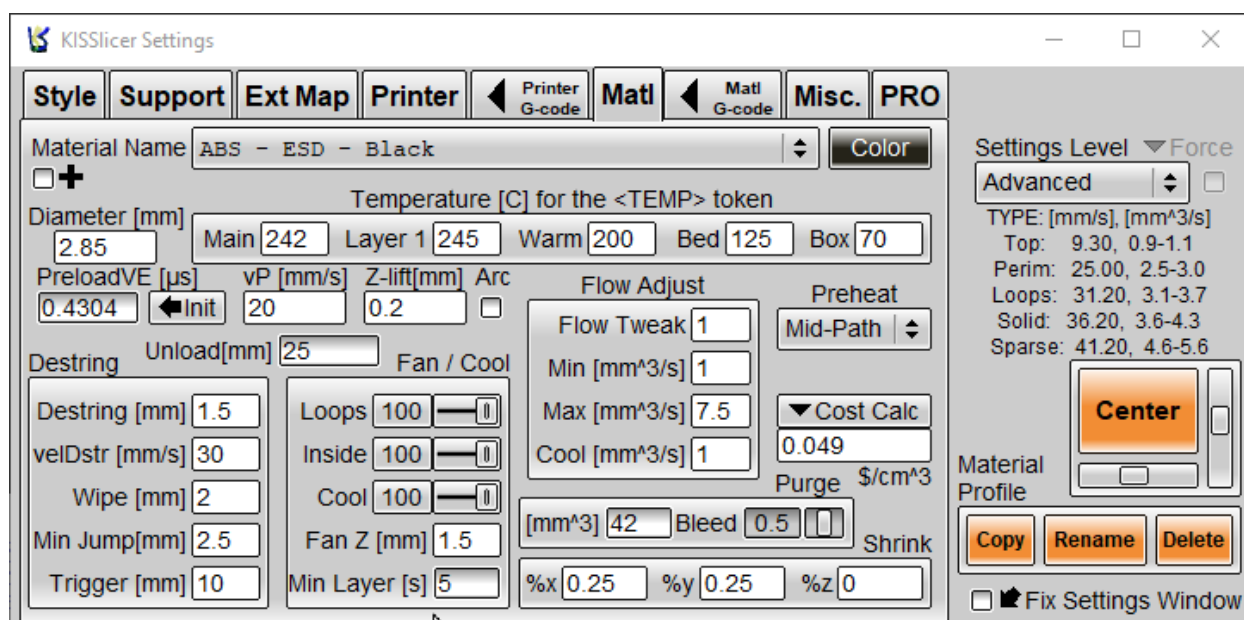
1. Get the material manufacturer's datasheet and 3D printing information
 - Find the Minimum Required Material Data:
 - Material Family
 - Filament Diameter
 - Print (Nozzle) Temp
 - Printer Bed Temp
 - Heated Chamber Needed?
 - Determine the potential build surface
 - Determine the initial print parameters
 - Identify any known support material/strategies and tribal knowledge
2. Review your model(s) to determine what type of support is required
 - What do you want to print?
 - Prototype for eventual AM production?
 - Prototype for other process production?
 - Are you open to alternative material suggestions (if any)?
 - Make sure your geometry is taking into account DFAM considerations
3. Do initial test printing to:
 - Sort flow, bonding, surface finish, range of Z heights, etc.
 - Initial support testing with standard support materials
 - Determine under or under and on top
 - If no immediate support material solutions review self-support strategy / testing
4. Print part with updated parameters
5. Determine if material/support pairing is suitable/desirable for release
 - Make sure someone is updating and managing the Material Profiles as needed, to avoid duplicate profiles or printing errors.

1.2 What is a Material Profile?

A material profile in KISSlicer contains all the printer, process and extruder settings that are necessary for the TRAK 3ntr printer to successfully 3D print a specific material using the FFF process.

Parameters of a material profile include the actual filament diameter, temperature settings for extruder, bed, and box, material shrinkage ratios, and extruder feed/flow control settings.

NOTE – The TRAK 3ntr A2/A4 printers are only suitable for printing polymer base materials suitable for FFF (Fused Filament Fabrication), also known as FDM (Fused Deposition Modeling) or filament freeform fabrication. This includes composite materials of a polymeric matrix with short or long hard fibers. Ceramic or metals cannot be printed with the TRAK 3ntr A2/A4 printers.



Example of a Standard/Reference Material Profile for ABS-ESD Black

1.3 What is the Material Profile Wizard?

The Material Profile Wizard in KISSlicer is a software tool that automates, simplifies, and speeds the process of creating a new material profile (from scratch) with basic information that most open platform 3D print materials manufacturers supply.

The printer wizard is necessary because when using an open materials platform on an industrial grade printer, there are many parameters that must be correctly input for successful 3D printing.

The Material Profile Wizard takes basic information such as the polymer family/materials grouping and some limited specific information about print temperatures from the material datasheet, then generates a complete materials profile that can be saved, used as a starting point for initial prints, later adjusted, if necessary, for improved print results. For convenience, the wizard allows you to name and save the new material profile, and as well, map it to the extruder where it will be used.

Material Profile Wizard

Enter the values, choose a name for the Material Profile then click [Create]

Material Family: PLA (Sets initial temp, fans, PreloadVE)

Print Temperature [C]: 195

Bed Temperature [C]: 43

Filament Diameter [mm]: 0

☐ Heated Chamber (affects fan)

In Extruder: ☐ Ext1, ☐ Ext2, ☐ Ext3

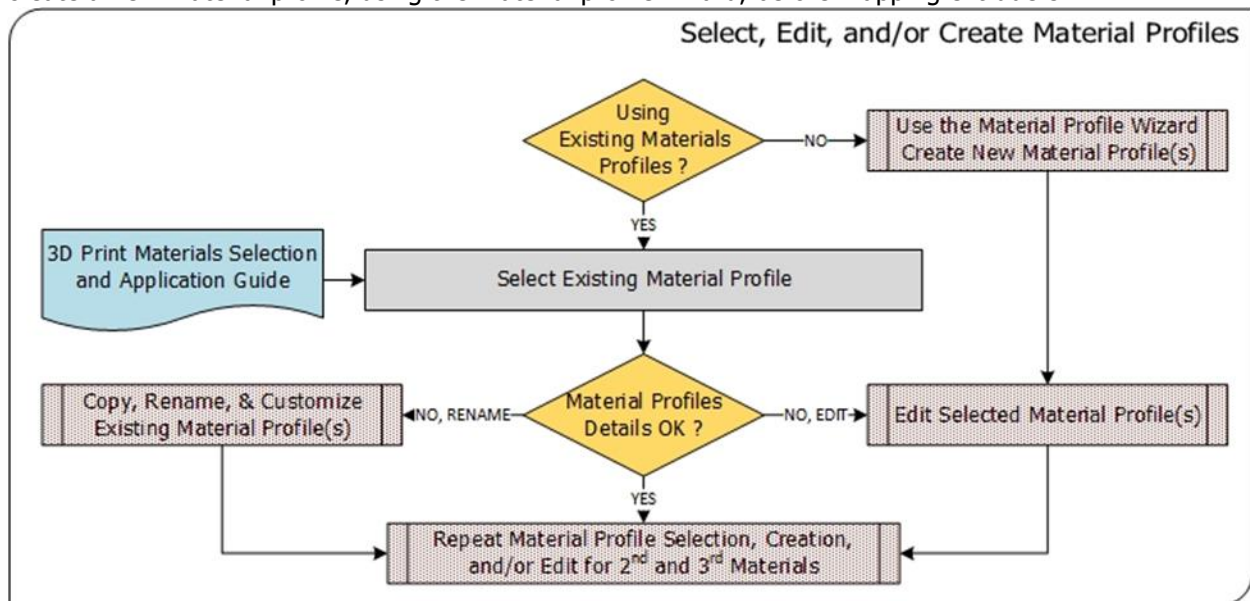
Material Profile Name: _____

Create Material **Cancel Material**

KISSlicer Material Profile Wizard

1.4 Using the Materials Profile Wizard in a 3D Print Project Workflow

Material Profiles must exist and be selected before the program for TRAK 3ntr printers, in the form of a G-Code file, can be created using the KISSlicer slicing software program. Since making a G-code file requires selecting from the materials profiles available within the application to map extruders, you must create a new material profile, using the material profile wizard, before mapping extruders.



Making a G-Code File Workflow: Materials Profiles

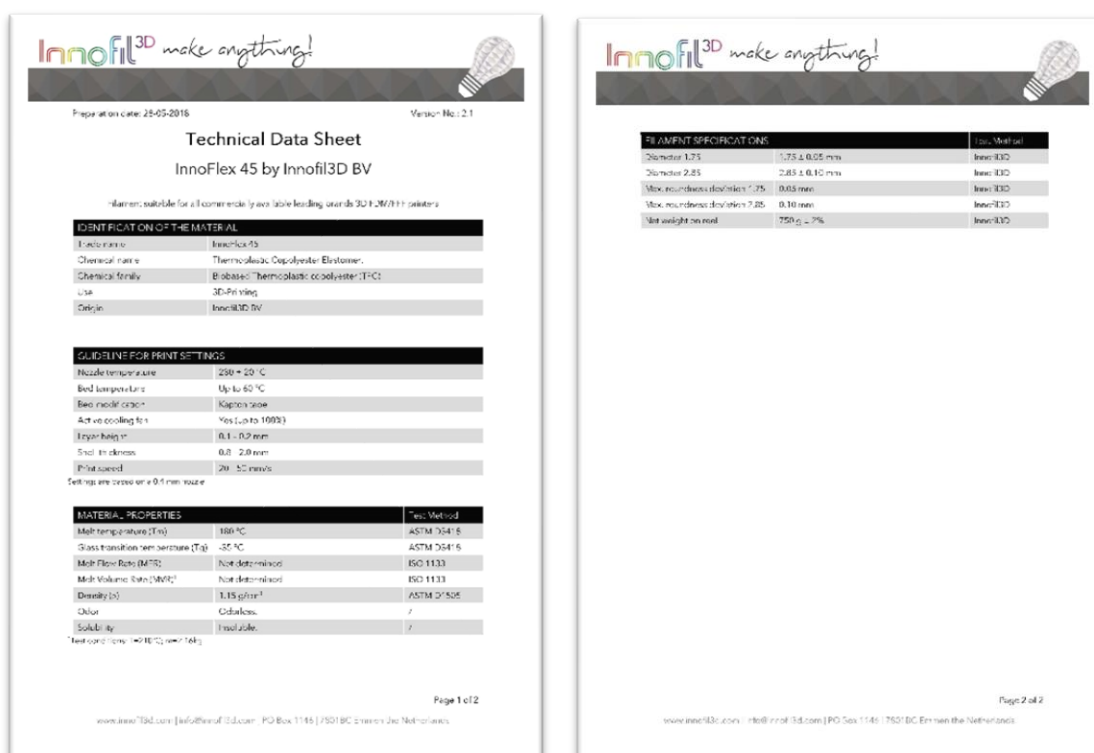
2.0 Process

In this section, we will cover the step-by-step sections on how to customize current Material Profiles or Create new ones using the Material Profile Wizard.

2.1 Gathering Material Information

Whether you plan on customizing a current Material Profile, or creating a new Material Profile by using the Material Profile Wizard, you must obtain the minimum required material data. The following information can usually be found in the material manufacturer's datasheet and 3D printing information:

- Material Family
- Filament Diameter
- Print (Nozzle) Temp
- Printer Bed Temp
- Heated Chamber Needed?



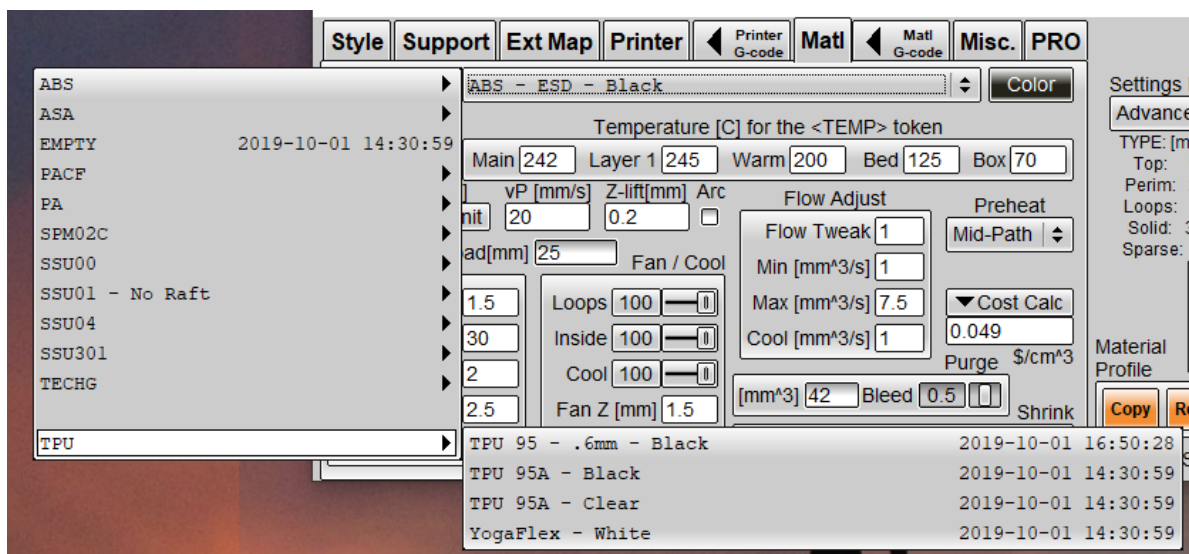
Example of Material Manufacturer's Technical Information

2.2 Checking for Pre-Existing or Similar Material Profiles

Before creating a new material profile, check to see if a standard material profile can be used as-is or if you can edit/customize pre-existing / similar material profile rather than use the Material Profile Wizard to create a new one.

1. Open the KISSlicer software application to browse the list of standard materials profiles and see if use of the material wizard is necessary.
 - a. Click Profile **Settings** > **Matl** to display the Materials Profile parameter settings for the current selected material.
 - b. Next, Click the selector next to the material name to browse the current list of material profiles. You may also need to click on the material class to open up the sub-menu and see all the profiles.

NOTE – The materials profiles may be nested in sub-menu's, you must click on the group to open the sub-menu and see all the individual profiles within that material grouping/family.



Browsing the List of Existing/Standard Material Profiles

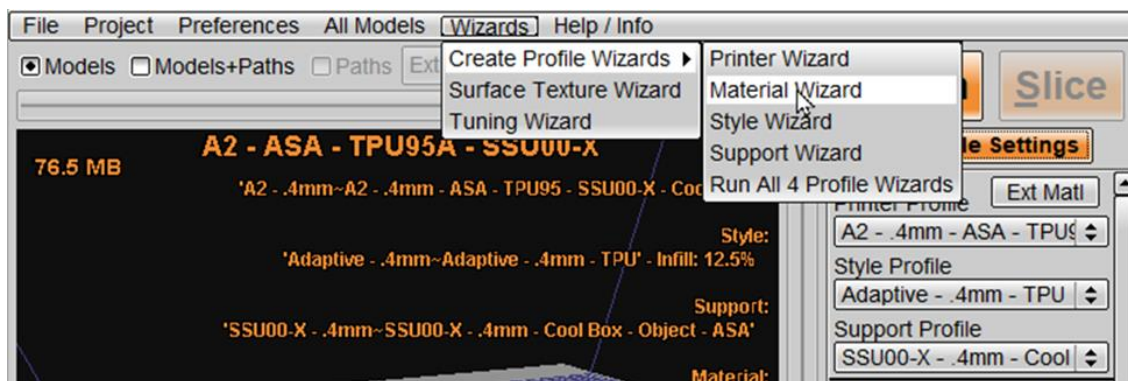
2. From the materials family listed by the manufacturer, look within similar materials profiles to determine if the exact material type profile already exists within KISSlicer.
3. If there is a pre-existing material profile that closely matches the new material:
 - a. You may choose to copy this standard/reference profile,
 - b. Save it under a new name,
 - c. Then proceed to customize any of the parameters needed for the new material profile you wish to add.

If a pre-existing or similar Material Profile cannot be found, and a new Material Profile is to be created from scratch then proceed to the next section. Otherwise, feel free repeat the steps shown above for every new Material Profile you wish to create out of a pre-existing / similar profile.

2.3 Creating a New Material Profile Using the Material Profile Wizard

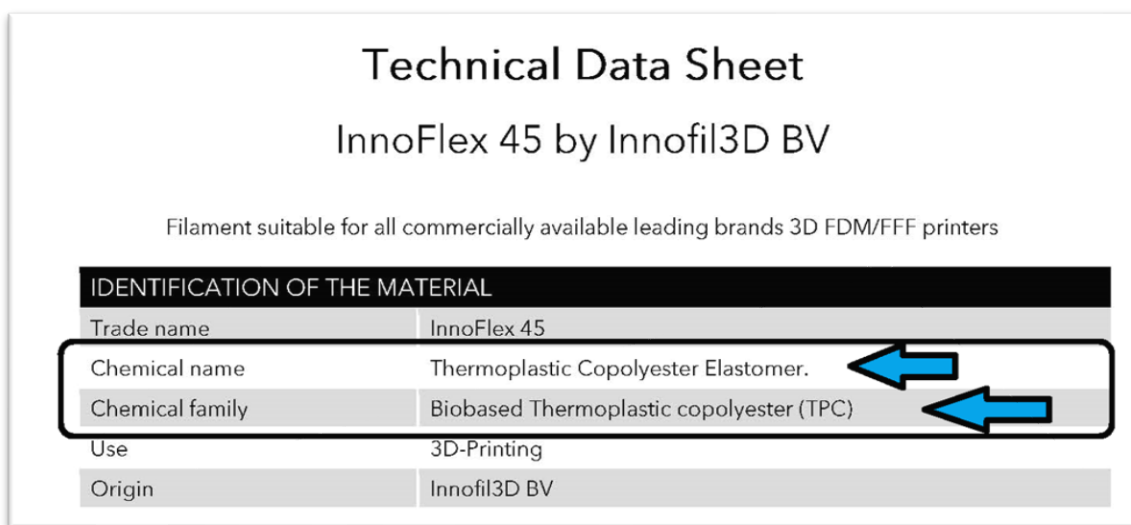
NOTE - Use of the Material Profile Wizard is typically not necessary for print projects that use a pre-existing Material Profile or TRAK Qualified 3D print materials whose reference material profile already exists within the KISSlicer application.

1. From the top menu go to Wizards>Create Profile Wizards>Material Wizard



Launching the Material Wizard in KISSlicer

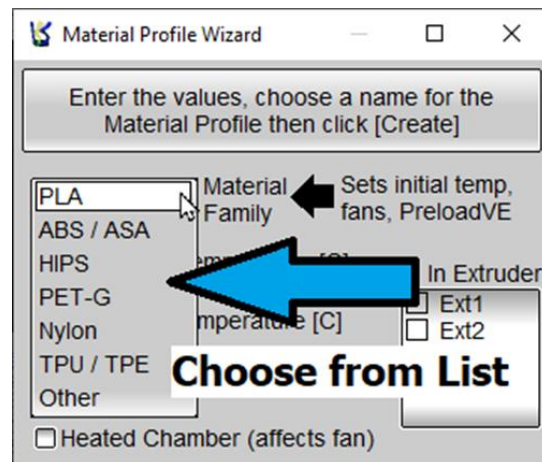
2. Review the material manufacturer's datasheet to determine the base polymer (materials family).



Finding Material Family in Manufacturer's Datasheet

NOTE – You may not recognize the manufacturer's materials family name as one on the list. If necessary, consult a filament materials directory to determine the materials family before selecting other in the materials wizard

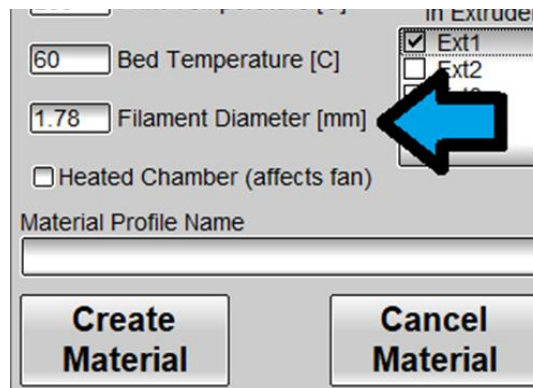
3. Go to the Material Profile Wizard to input this information by selecting from the nearest Material Family. Choose other if you find that none of the choices are applicable to the new material.



Choose the Materials Family within the Materials Profile Wizard

NOTE - In this example, after looking up the chemical family, it was determined that TPU/TPE is the nearest option in the Material Profile Wizard.

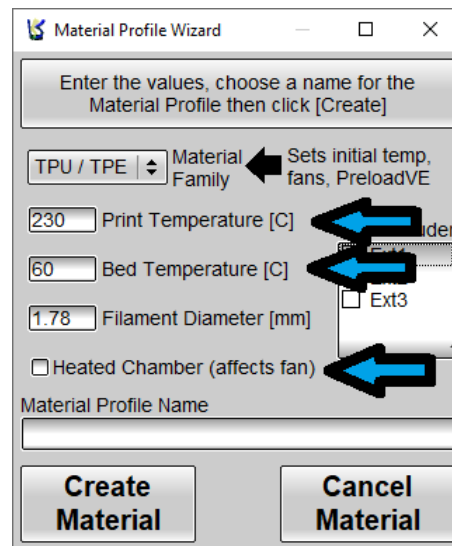
4. Carefully measure the filament's actual diameter by using a micrometer. Measure 20cm or so from the end, at 90° angles. Find the average, then enter the value within the Filament Diameter input of the wizard.



Enter Actual (Measured) Filament Diameter

NOTE – Measuring and entering the actual filament diameter is a critical aspect of creating a good material profile that will print reliably and repeatably. There are variations among batches and manufacturers, so always measure and update the actual filament diameter for good prints.

5. Enter the Print (Nozzle) & Printer Bed Temperatures from the manufacturer's datasheet.



Entering Manufacturer's Technical Data into the Wizard

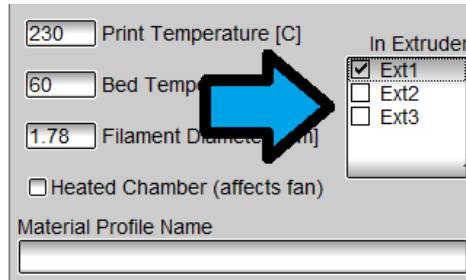
GUIDELINE FOR PRINT SETTINGS	
Nozzle temperature	230 ± 20 °C
Bed temperature	Up to 60 °C
Bed modification	Kapton tape
Active cooling fan	Yes (up to 100%)
Layer height	0.1 - 0.2 mm
Shell thickness	0.8 - 2.0 mm
Print speed	20 - 50 mm/s

Settings are based on a 0.4 mm nozzle

Finding Printer (Nozzle) & Bed Temperatures in manufacturer's datasheet

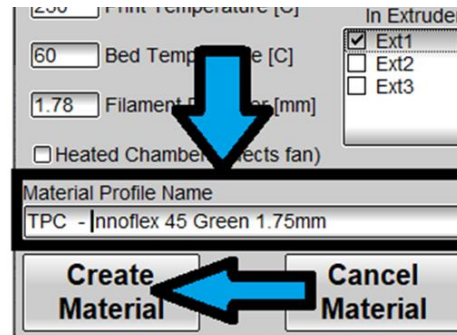
NOTE – Make note of other specific printing information from manufacturer. In this materials example, Kapton tape must be used on the printer bed plate.

6. If desired, map the new material profiles to the selected extruder. This step can be done later in the process of making a G-code file (mapping extruders); however, it is convenient and time saving to assign it to extruder(s) with the wizard.



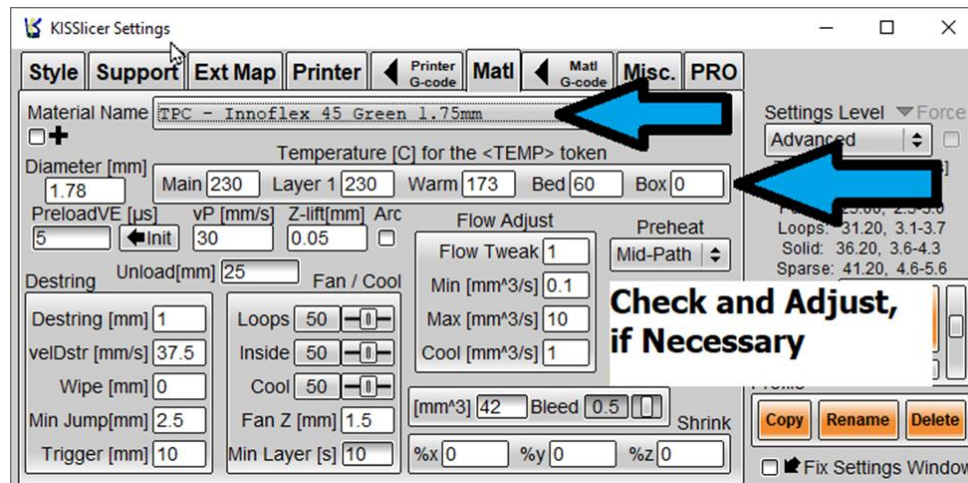
Select Extruders to Assign New Material Profile

7. Enter a descriptive name for the new material profile and click "create Material Profile"



Enter a Name and Click "Create Material"

8. Go to the **Settings > Matl** tab to review the new profile details.
 - a. If the new Material Profile does not appear, click the selector button for Material Name, then browse and find the recently created profile.
9. Review all material profile settings and adjust as necessary.



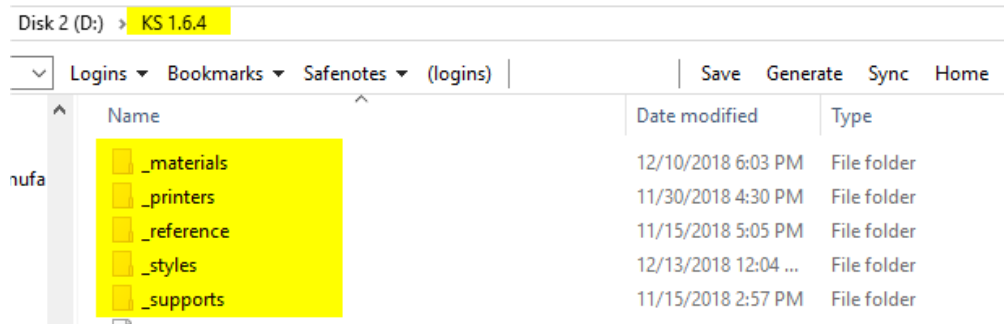
Check and Adjust Parameter Settings for New Profile

10. The process is now complete.

3.0 Adding & Restoring Profiles to KISSlicer 1.6x & 2.x Installations

3.1 Adding Profiles

KISSlicer organizes the four different (.ini) file types by directory under the KS root, which typically looks like the image below.

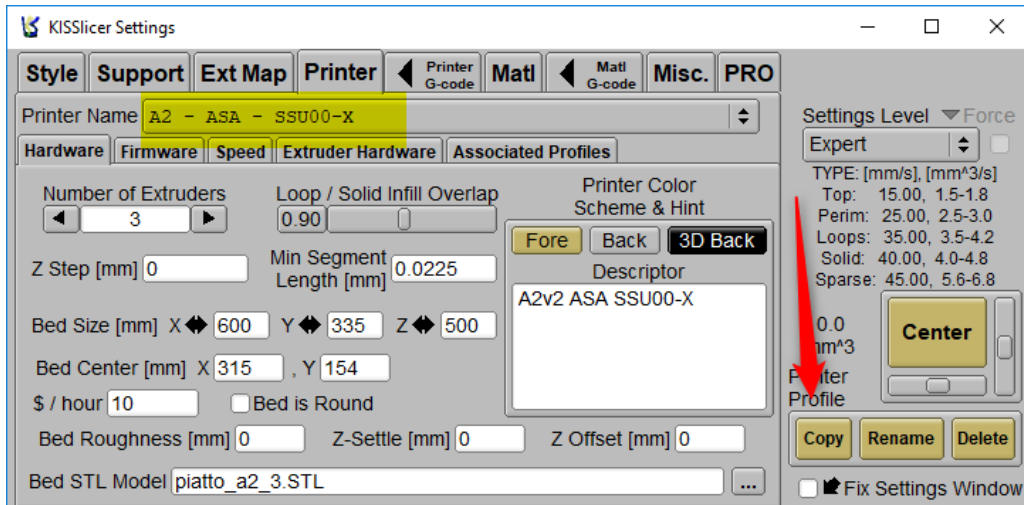


Steps to Add & Update your reference profiles.

1. Close KISSlicer
2. Copy desired (.ini) files into the appropriate directory (listed below):
 - a. _materials
 - b. _printers
 - c. _styles
 - d. _support
3. Update and refresh your reference profiles
 - a. Multi-select the above four directories and drag/drop/copy them into the "_reference" directory. These will now be the files from which the data comes for a Quick Restore.
4. Re-Open KISSlicer
5. New Profiles should now be available

NOTE - We strongly suggest organizing KISSlicer by making a copy of your printer for any setup to which you'll return regularly, then choose all the parameters. Going forward, just pick this printer and everything will be set for you.

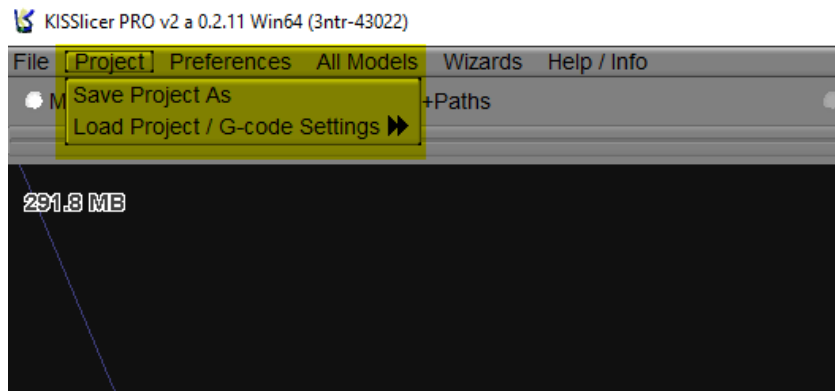
NOTE - KISSlicer autosaves changes to the template you are changing when you make a change, so the workflow to make a new Printer, Support Strategy, Style or Material is to start with an existing template, choose copy, give the template a new name, then proceed to make the desired changes. You can now recall that template any time, or, include it in a new printer definition as desired.



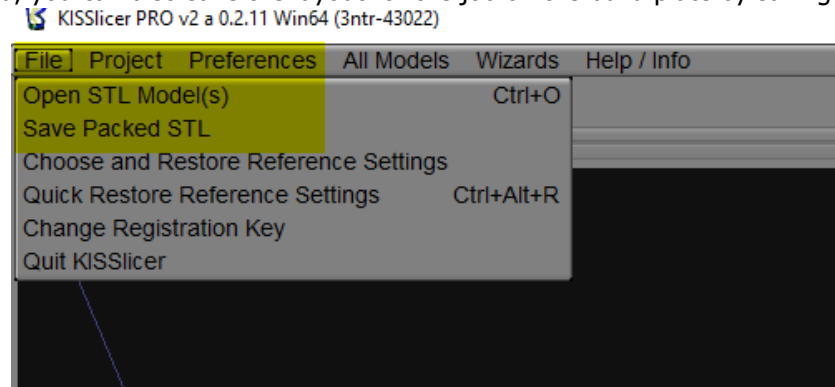
3.2 Projects

Additionally, if you want to archive and be able to reload all the specific settings for a specific job, you can use Projects.

With everything set as desired select Project Save As to the same location as the other files for this job. Later you can reload the Project and start slicing immediately.

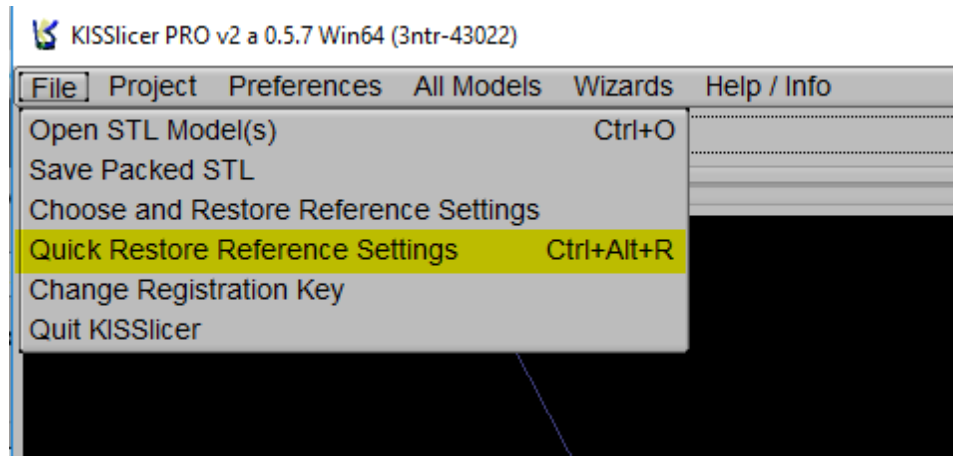


NOTE - If desired, you can also save the layout for the job on the build plate by saving a packed STL.



3.3 Restoring Factory Settings

Beginning with KISSlicer 1.6.4 and 2.0.x, you also have the ability to restore all Plural-distributed profiles to their original (last saved) state by using the **Quick Restore Reference Settings** option or shortcut keys.

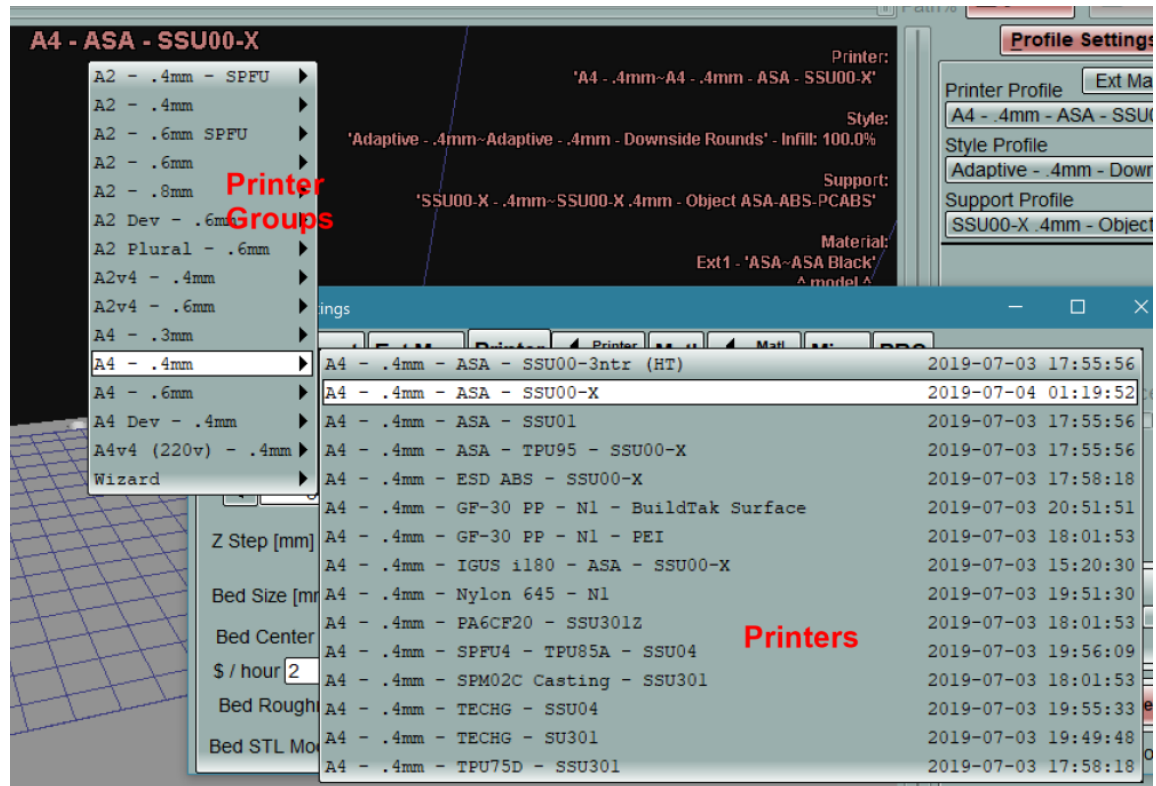


Be sure to update Reference Settings in the “_reference” directory with any **new** profiles added to KISSlicer from Plural after your initial installation.

Name	Date modified	Type
_materials	12/10/2018 6:03 PM	File folder
_printers	11/30/2018 4:30 PM	File folder
_reference	11/15/2018 5:05 PM	File folder
_styles	12/13/2018 12:04 ...	File folder
_supports	11/15/2018 2:57 PM	File folder

4.0 Groups

This is a great tool for organizing printers, materials, support types and styles by group. Makes it much easier to find the setup for which you're looking, and will help eliminate duplicate data.



4.1 Creating a Group

1. To make a group, preface printer, material, support or style name with "Groupname~" (tilde) or forward slash "/" or backslash "\". KISSlicer will replace either slash with a tilde.



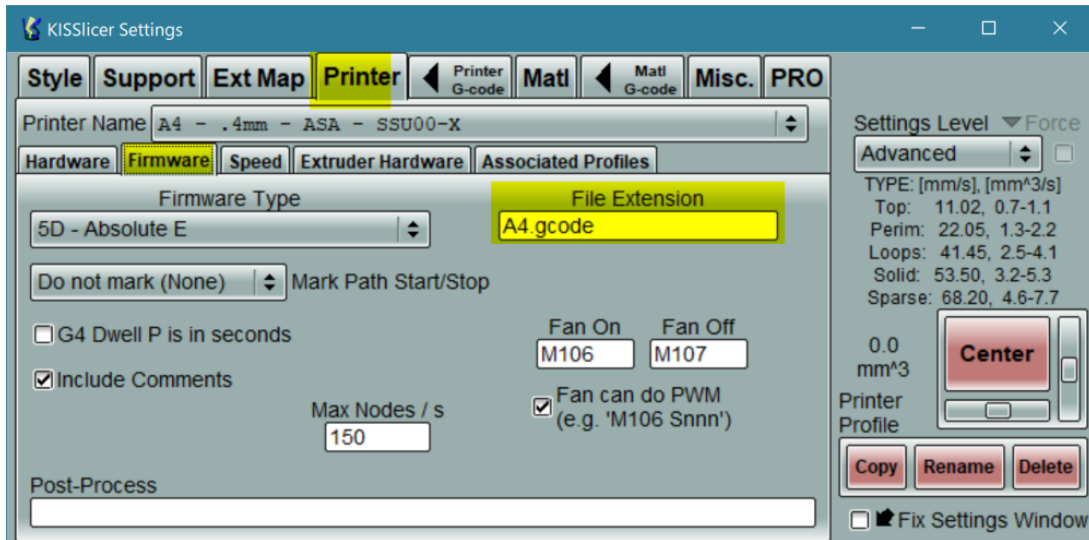
2. Copy and Rename **work** as they do now, just add group name with the Rename function, or copy an object that already has a group name, and, you're organized!

4.2 Custom File Extensions

KISSlicer can automatically add the file extension information based on the printer, for example:

partfilename.A2v4.gcode or *partfilename.A4.gcode*

Or you can edit the File Extension within the Printer Tab, by going into the Firmware Tab.



A standard beginning with KISSlicer V2 will use this utility to identify which base printer for which the G-code was written.

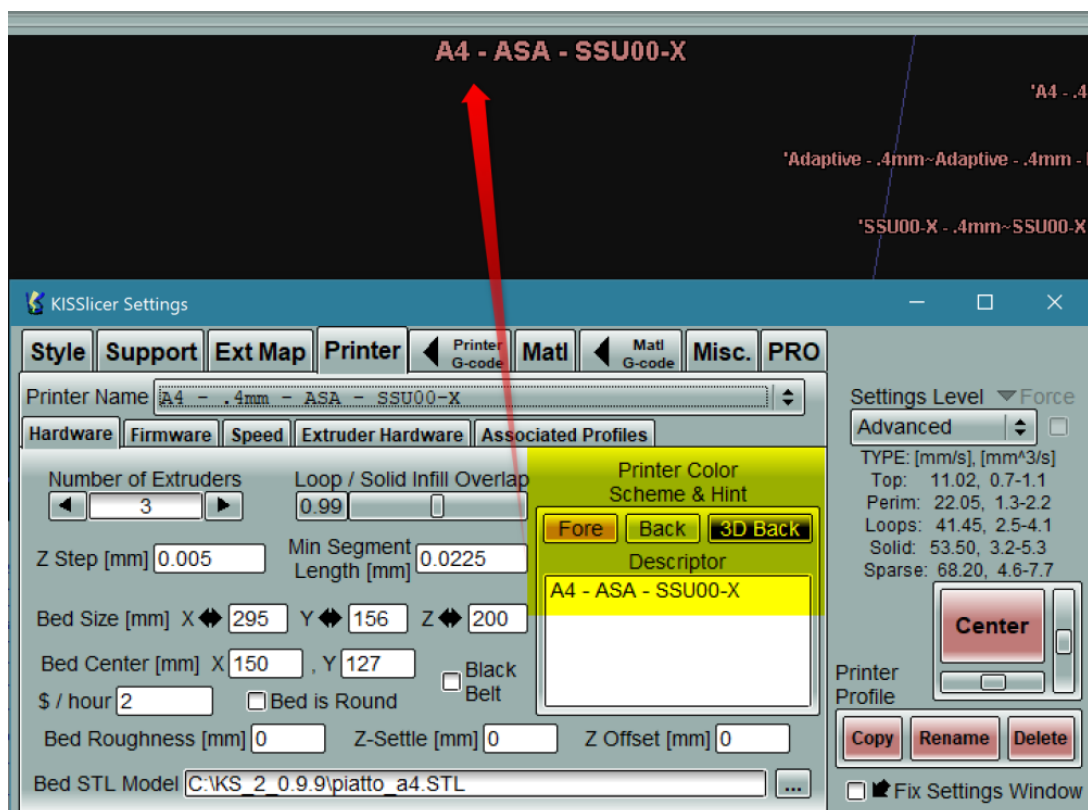
- A2 – A2.gcode = A2v2 Printers
- A4 – A4.gcode = A4v2, v3 and 110-volt v4 Printers
- A2v4 – A2v4.gcode = A2v4 Printers
- A4v4 – A4v4.gcode = A4v4 220-volt Printers

5.0 Additional Features

- **Surface Textures** – An innovative feature that allows textures to be applied during a print on a part's Z-axis walls. Textures can be randomly generated with KS's built-in generator or copied from physical textures using grayscale images.
- **Dynamic Infill Density** – This feature is primarily intended for use with soft materials, allowing a variable density infill to be used to vary the density of a part.
- **Gyroid Infill** – This infill has become our default, it is strong, fast-to-print and light.

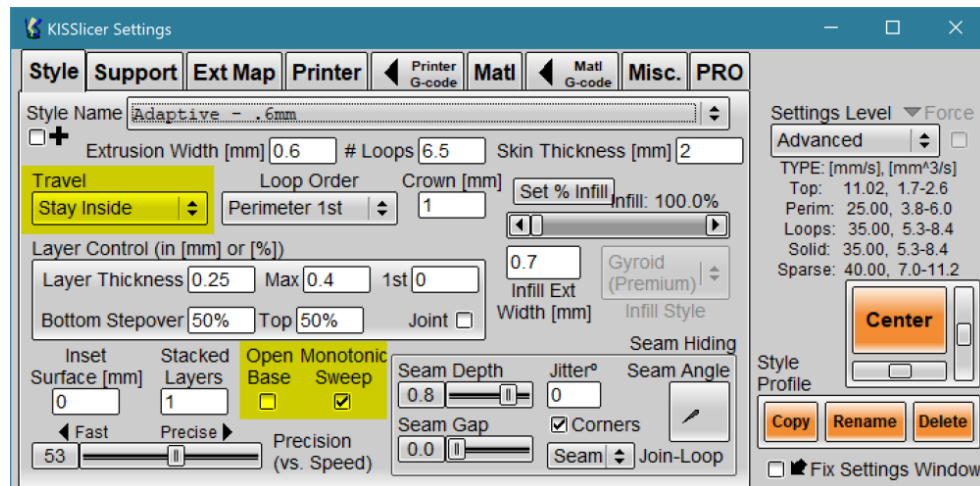
5.1 Print Tab

- Color Scheme and Graphics Window title per defined printer. Great help in making it easy to identify that you've changed printers. Associate colors with build material setups, etc.



5.2 Style Tab

- Smart Travel Paths – Two new options for print head travel, Stay Inside or Avoid Edge Crossing. Stay Inside is our new default, very minor speed cost, cleaner prints, especially with TPU, but good for all materials. Largely eliminates the need to use Wipe.
- Open Base – For special applications, like vacuum tooling, the bottom skin can be left off the build with this option.
- Monotonic Sweep – Simplifies and “cleans up” tool paths on interface layer and first layers of parts. Much improved cosmetics for downside surfaces that contact support interface. This is also a new default for us and this installation.



TRAK Warranty Policy

Warranty

TRAK products are warranted to the original purchaser to be free from defects in workmanship and materials for the following periods:

Product	Warranty Period	
	Materials	Factory Labor
New TRAK/ProtoTRAK	1 Year	1 Year
Any EXCHANGE Unit	90 Days	90 Days

The warranty period starts on the date of the invoice to the original purchaser from Southwestern Industries, Inc. (SWI) or their authorized distributor.

If a product, subsystem or component proves to be defective in workmanship and fails within the warranty period, it will be repaired or exchanged at our option for a properly functioning unit in similar or better condition. Such repairs or exchanges will be made FOB Factory/Los Angeles or the location of our nearest factory representative or authorized distributor.

Warranty Disclaimers

- This warranty is expressly in lieu of any other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular purpose, and of any other obligations or liability on the part of SWI (or any producing entity, if different).
- Warranty repairs/exchanges do not cover incidental costs such as installation, labor, freight, etc.
- SWI is not responsible for consequential damages from use or misuse of any of its products.
- TRAK products are precision mechanical/electromechanical/electronic systems and must be given the reasonable care that these types of products require. Evidence that the product does not receive adequate Preventative Maintenance may invalidate the warranty. Excessive chips built up around ballscrews and way surfaces is an example of this evidence.
- Accidental damage, beyond the control of SWI, is not covered by the warranty. Thus, the warranty does not apply if a product has been abused, dropped, hit or disassembled.
- Improper installation by or at the direction of the customer in such a way that the product consequently fails, is considered to be beyond the control of the manufacturer and outside the scope of the warranty.
- Warranty does not cover wear items that are consumed under normal use of the product. These items include, but are not limited to: windows, bellows, wipers, filters, drawbars and belts.