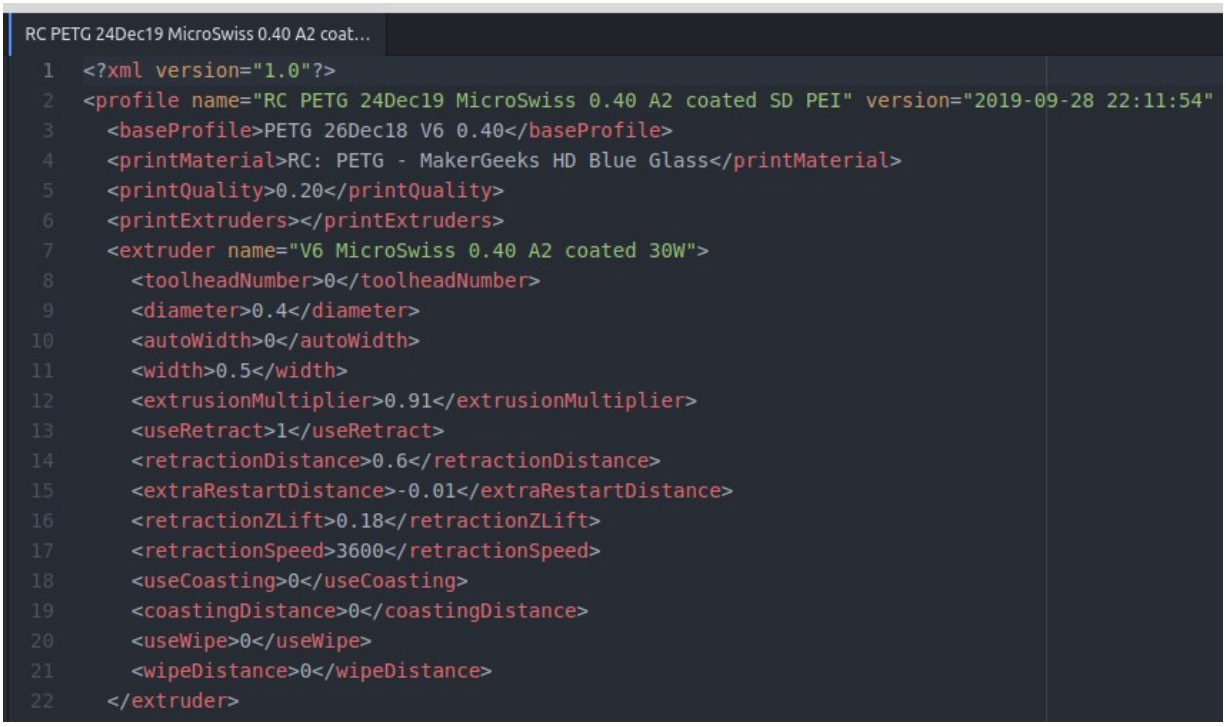
Simplify3D profile management PlasticMetal 24 March 2020

Simplify3D (“S3D”) has a robust parameter profile system at its core. Unfortunately, as with most of its features, it is not documented well, if at all. After a couple years of frustration with losing detailed profiles due to mysterious interactions between them, I finally found posts on the S3D forum from other users not only detailing their woes, but how they resolved them. To give proper credit, I did come across a few posts from S3D customer service talking about this, but why they don’t have “official” documentation I’ll never know.

In a nutshell, when exported the profiles (dubbed “.fff”) are in an XML (extensible markup language) format, which simply means specifically organized text. To export a profile, choose *File > Export FFF profile*. A drop-down box will appear, from which you choose one to export. Save it in a location you can find again (for example, mine are in *.../3D_Printing/S3D/FFF backups/RailCore*). I have a separate directory for my delta printer.

There are many XML editors out there, which I recommend over basic text editors like Notepad. I prefer Notepad++ (unfortunately only for Windows), but have started using Atom in Linux. Find your exported profile, right click on it and choose to open it with your editor.



You'll see something like this. Ignore any text differences – it's the formatting that's key. If you've ever looked at the gcode S3D exports for your printer, you'll note this is the exact same information, just displayed better. The first thing you want to do is save the file under a new, unique name. I've adopted the format of *printer-material-date-nozzle brand-nozzle size-nozzle coating/material-bed surface* (ignore the hyphens). Save it with an .xml extension – S3D will import it just fine.

Depending on your editor, different text will be in different colors – this is critical. In the example above from Atom, text in red is used by S3D – do not change it! You can re-arrange any sections, but do not alter the spelling, spacing or capitalization of red text. I'll call these the *parameters*. White and green text is also used by S3D, but they are the *variables* and labels used in the various entry boxes within S3D; these are what you want to customize.

The other key note is that markup languages require clearly defined starting and ending markers for each command, in the format of *<parameter>variable</parameter>*. Every line has be marked in this format, but if there is not a parameter, but rather just text, you won't see the final */parameter*, but there will always be the starting & ending symbols. There can be multiple levels of parameters under a given parameter. For example, line 2 above starts with <*profile*>, but the closing </*profile*> doesn't appear until the final line in the file.

A nice feature of XML editors is that they will indent each sub-section, defining the hierarchy, making it visually much easier to organize, and they will give an error if you've messed the formatting up. In my experience that's usually because the final *</parameter>* was accidentally deleted.

The S3D profile has three sections:

1. General
2. Material
3. Quality

Part of the General section is shown above; it contains the header, profile name, Material name, Quality name, extruder(s) information, and all the remaining data fields that you see in

the FFF Settings pop-up window tabs. Many of these parameters are later duplicated in the Material and Quality sections – it seems that S3D uses this General section as the initial values to populate those sections when a profile is first loaded. If you then choose a different material or quality from a drop-down box, values from the appropriate Material and/or Quality section of the XML file will then be displayed. So, my process is to simply choose a filament and quality settings from the Material and Quality sections, and duplicate them in the General section. In theory, you could have a completely different set of material & quality settings in the General section as compared to Material and Quality sections, but if you were to choose different values from the drop-downs, you couldn't get back to the original settings without first choosing a completely different profile, then re-loading the original profile. So, just duplicate them and be done with it.

```
215    <autoConfigureMaterial name="RC: PETG - MakerGeeks HD White Glass">
216      <extruder name="V6 MicroSwiss 0.40 A2 coated 30W">
217        <toolheadNumber>0</toolheadNumber>
218        <diameter>0.4</diameter>
219        <autoWidth>0</autoWidth>
220        <width>0.5</width>
221        <extrusionMultiplier>0.88</extrusionMultiplier>
222        <useRetract>1</useRetract>
223        <retractionDistance>0.6</retractionDistance>
224        <extraRestartDistance>-0.01</extraRestartDistance>
225        <retractionZLift>0.18</retractionZLift>
226        <retractionSpeed>3600</retractionSpeed>
227        <useCoasting>0</useCoasting>
228        <coastingDistance>0.2</coastingDistance>
229        <useWipe>0</useWipe>
230        <wipeDistance>5</wipeDistance>
231      </extruder>
232      <temperatureController name="V6 MicroSwiss 0.40 A2 coated 30W">
233        <temperatureNumber>0</temperatureNumber>
234        <isHeatedBed>0</isHeatedBed>
235        <stabilizeAtStartup>1</stabilizeAtStartup>
236        <setpoint layer="1" temperature="235"/>
237        <setpoint layer="2" temperature="243"/>
238        <setpoint layer="3" temperature="250"/>
239      </temperatureController>
240      <filamentDiameters>1.72|0|0|0|0|0</filamentDiameters>
241      <filamentPricesPerKg>15|0|0|0|0|0</filamentPricesPerKg>
242    </autoConfigureMaterial>
243    <autoConfigureMaterial name="RC: PETG - MakerGeeks HD Blue Glass">
244      <extruder name="V6 MicroSwiss 0.40 A2 coated 30W">
245        <toolheadNumber>0</toolheadNumber>
```

The Material and Quality sections are organized identically, but this is where the profile system begins to shine. By putting whatever parameter you want in each section, that parameter will be tied to either that material or quality label (I'll call them "associations"). The default S3D associations are bunk and cause a lot of confusion among users. You can choose just how you want any parameter to track through your materials. For example, you can define your coast & wipe and cooling settings per filament (i.e. material), while the infill percentage and supports are defined by the quality level. Or, not. Other than a few obvious parameters that must be associated with Material and Quality, you don't have to have any other parameters be associated, as they're still defined in the General section. You likely won't do this, though, as defining and associating specific parameters is what we're all trying to accomplish.

Each Material and Quality entry can contain multiple entries. I've chosen to create a profile for each filament type, e.g. one for PETG, one for TPU, etc. Within each profile, I have a material entry for each specific filament, e.g. Atomic Carbon Fiber, MakerGeeks HD White Glass. I don't have Quality defined by low, medium or high, but rather by layer height. Within a Quality entry, I specify layer height, number of solid layers (top & bottom), and first layer height percentage. You may note that while I specify per-layer filament temperatures in the Material section, I've chosen not to specify the bed temperature, as I've found a common 75C generally works well across all my PETG filaments. Thus, I just let it be defined in the General section. It's easy enough to tweak if needed for a particular build.

Each Material entry must contain the identical parameters as every other Material entry, and each Quality entry must contain the identical parameters as every other Quality entry. The specific values for each will obviously be different. If one entry is missing a parameter, that parameter is ignored in all material/quality entries, and that parameter uses the "default" value from the General section.

Some parameters have a "parent/child" relationship which must be maintained. For example, *temperatureController* is the parent, and *temperatureNumber* (and others) are the children. If you want to move *temperatureController*, move the children with it.

Once you've begun to customize your profiles, make sure you save "master" copies. While you can recover a profile by re-exporting it out of S3D, the formatting and hierarchy may be altered, making it difficult to reconstruct. You must force yourself into the habit of choosing "*Save as New*" and renaming the profile if you've made changes you want to save, rather than just clicking "*Update Profile*" if you want to preserve the hard work you've put in.