SWITCHING FDM MATERIAL COLOR

Stratasys®
3D Printers and
Production Systems

SOFTWARE/**PRODUCT**/FINISHING

OVERVIEW:

FDM® materials including ABS-M30™, ABSi™, ABS*plus*™ and ASA are available in multiple colors. These colors offer the capability to mimic the appearance of finished goods, increase visual appeal or distinguish regions of interests (Figure 1). They can also make features more prominent, which is often desirable for adding text, guides and graphics (Figure 2).

1. CONSIDERATIONS

1.1. Changing material color requires replacing the loaded material canister, regardless of whether you are making new parts in a different color or making multi-color parts. A standard material change is accompanied by a tip change and calibration. For cases where this is not possible, and there is only a change in material color, a purge sequence may be used (e.g., changing from ASA yellow to ASA blue, with no change in slice height or material type).

FDM multi-color parts can be made when the color delineation is between build layers. During the build process, the FDM machine pauses for a material (color) change and then resumes to either complete the part or reach a layer where there will be another color. Each color change requires a purge sequence to remove material from the extrusion tip. This prevents unwanted color transitions and ensures the desired color is printed beginning on the selected layer.

> **NOTE:** Descriptions of all the commands are available through the Insight™ software help menu. Many of these settings can have detrimental effects on your parts if not used properly. It is recommended that only experienced users make changes to these values. To ensure the best possible part quality, Stratasys® recommends that you always review the toolpaths on your parts and make modifications if necessary, before downloading them to your system.

Figure 1: Multi-color FDM ABS-M30 mobile phone case.
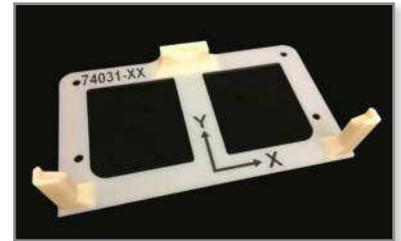
Figure 2: An inspection fixture that incorporates multiple ABS-M30 colors to increase contrast and visibility of incorporated text.

2. PROCESS:

2.1. Prepare the build job using Insight software.

STEP 1: Configure the modeler.

STEP 2: Open, orient and slice the STL file.

STEP 3: Click ▤ to create supports.

STEP 4: Click ◎ to create toolpaths.

STEP 5: If the model will only be a single color, proceed to Step 7. Otherwise, in the *Toolpaths* menu drop-down, select *Insert Pause* (Figure 3).

STEP 6: Select the first layer where the color change will occur and click **OK**. The part boundary curves of the selected layer will change to white.

> **TIP:** Adding the build pause must be the last action before saving the job.

STEP 7: File preparation procedure complete.

2.2. Build the part.

STEP 1: If the installed material is satisfactory for the build, start the build and proceed to Step 4. If the material needs to be changed, unload the previous material by navigating to the Unload Material menu on the FDM machine's control panel. Once the filament is unloaded, remove the cartridge or canister.

STEP 2: Prepare the canister, install it in the material bay, and load the material to the liquefier tip. Monitor the process to ensure that the material loads and purges properly.

> **NOTE:** The unloaded and new material must be the same type.

STEP 3: Initiate purge cycles using a manual purge from the Unplug Tips function.

> **NOTE:** A purge cycle can also be initiated by starting a Load Material operation while the material is already loaded.

> **TIP:** Additional purges prevent the first color from transferring to the second. This is especially important when the second material is a lighter color than the first. For complete purging of all color from the previous material, a minimum of 4 purge cycles is recommended.

> **NOTE:** A tip change is always recommended after ASA blue is unloaded. If the tip is not changed, expect some discoloration even after a large number of purge cycles.
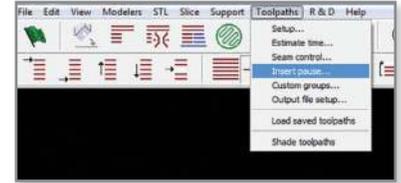
Figure 3: The Insert Pause command is found in the Toolpaths menu.

STEP 4: If the model is a single color, allow the build operation to continue and proceed to Step 9. If the build contains a pause, allow the operation to continue until the process pauses.

> **NOTE:** When the build reaches the layer on which a pause was inserted, the machine will automatically enter an idle mode and wait for user action. Build progress may be monitored remotely using Control Center™ software.

STEP 5: Unload the FDM material by navigating to the Unload Material menu on the FDM machine's control panel. Once the filament is unloaded, remove the canister.

STEP 6: Load the material for the next color by placing the canister in the machine and initiate the Load Material sequence from the control panel. Initiate purge cycles using a manual purge from the Unplug Tips function.

> **NOTE:** A purge cycle can also be initiated by starting a Load Material operation while the material is already loaded.

> **TIP:** Additional purges prevent the first color from transferring to the second. This is especially important when the second material is a lighter color than the first. For complete purging of all color from the previous material, a minimum of 4 purge cycles is recommended.

> **NOTE:** A tip change is always recommended after ASA blue is unloaded. If the tip is not changed, expect some discoloration even after a large number of purge cycles.

STEP 7: Resume the build.

STEP 8: Repeat Steps 5 and 6 for all subsequent color changes.

STEP 9: Build procedure complete.

3. SAFETY:

Observe manufacturer's recommendations for safety, material handling and storage. This information can be found in the Safety Data Sheets (SDS).

4. TOOLS & SUPPLIES:

4.1. Software:

- Insight software (documented with Insight 9.0)

5. MATERIALS:

These procedures are suitable for the following material types:

- ABS-M30

- ABSi

- ABS*plus*

- ASA

CONTACT:

To obtain more information on this application, contact:

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