



Antero 840CN03

Material Guide

Antero™ 840CN03 is a high-performance PEKK-based FDM® thermoplastic with strong mechanical properties along with exceptional material properties, such as electro-static dissipation, temperature resistance, chemical resistance, exceptional wear properties, and ultra-low outgassing. This makes it ideal for low-volume, highly-customized production parts and functional prototypes that need to withstand more intemperante conditions. Antero 840CN03's primary advantages over other Stratasys high-performance materials – such as ULTEM™ 9085 resin, ULTEM™ 1010 resin and PPSF – are its ESD, high chemical resistance, and low outgassing properties.

System Overview and Compatibility

Antero 840CN03 is currently available on the Stratasys F900™ and Fortus 450mc™ with a 0.010 inch (0.254 mm) slice height. It uses SUP8000B™ as a breakaway support system, similar to other Stratasys high-temperature material offerings. This support material is easier to remove than the other break away support systems. Antero 840CN03 will require a hardened head upgrade to your system. The primary difference between operating on an F900 versus a Fortus 450mc is that the F900 uses a T20D tip whereas the Fortus 450mc uses a T20F tip for the model material. The T20F tip has a slightly different design to achieve higher mechanical strength performance. Information on performance can be found on the Material Data Sheet. Both systems use a standard T16 tip for the support material. Antero 840CN03 and SUP8000B are available in standard 92.3 cubic inch Fortus Plus™ canisters only and the material will use the existing high-temperature material build sheets.



Part Design

Designing parts for Antero 840CN03 follows much of the same process for designing other FDM parts and design for additive manufacturing guidelines (DFAM) should be followed (e.g., utilizing self-supporting angles where possible, observing minimum wall thicknesses, allowing proper clearance for assemblies, etc.). A general list of DFAM guidelines can be found in the [FDM Design Guidelines document](#).

For Antero 840CN03 and other high-performance FDM materials, the breakaway support system is used to support the model material in areas of overhang to prevent sagging. Although Antero 840CN03 support is one of the easiest supports to be removed by hand, the designer should take this into account while designing the part. Self-supporting angles (angles greater than 45 degrees from the build platen) should be used whenever possible to reduce the need for support material. Areas that require support must be accessible for removal.

In order to design for ESD properties see the Antero ESD white paper. Be mindful of thin-walled structures (<0.25 in.) as they are susceptible to poor print quality due to the minimum time required for each layer to solidify enough to receive the next layer. This can be resolved by spacing out the parts in the printer or adding a purge tower.

Part Processing

This material is available in Insight™ and the Advanced FDM feature of GrabCAD Print™ software.

Support removal is the main consideration that should be taken into account during part processing. In areas where support cannot be eliminated by part design, the part must be oriented so the support is accessible for removal. Perforation layers can be added to the support structure to aid in removal of large areas of support.

Default processing parameters should be used unless the user is sufficiently advanced in Insight or GrabCAD Print and has determined that the changed values produce better results for a specific geometry.

Part Packing

Multiple Antero 840CN03 parts can be packed together in the same build. This often reduces build time (due to elimination of tip swaps between model and support for each part) and should be used to increase system utilization when operators are not present. For example, add another part to the pack so the build will finish in the morning rather than at night, or pack multiple parts together for a longer build over the weekend.

For higher quality seams and a reduced potential for purge material in the part, a sacrificial tower should be included in the pack, up to the full height of the parts. Refer to the **Options > Sacrificial tower** menu in Control Center™ software.

System Preparation

The system should be set up using the tips, build sheets, and hardened head mentioned in the system overview section of this document. A tip calibration must be performed when switching from a different material to Antero 840CN03, when replacing the tip at the end of its recommended life, or anytime the model or support tips are removed from the head. If the system was running lower temperature materials, be sure to vacuum out any scrap pieces or material in the purge tower to prevent the lower temperature material from melting or burning.

For the T20F tip on the Fortus 450, the area where the liquefier block locks the tip into the liquefier blocks has been filled to improve temperature control. This will require the operator to locate the tip precisely within the liquefier blocks. A small groove on the stainless steel area of the tip will need to face directly away from the operator when inserting the tip into the liquefier blocks. It will be important when tightening the liquefier bolts to verify that the blocks have completely closed together. If the tip is twisted and not aligned properly the blocks will not completely close leaving a gap. Adjust the clocking of the tip until the liquefier blocks are seated properly. Failure to align the tip properly may result in poor print quality and part performance.

The tip life of the T20D Antero 840CN03 tip is four canisters of material. The tip life for the T20D (used with the F900) and the T20F (used with the Fortus 450mc) is four canisters of material. The user will

receive a warning after three canisters of material and will be prevented from starting another build after four canisters of material without first changing the tip. It should be noted that many short toolpaths are harder on the tip than longer toolpaths. If building parts with many short toolpaths, it is recommended to change the tip when the tip warning is displayed (after three canisters of material) to prevent a potential decrease in print quality.

Support Removal

Parts are easily removed from the build sheet by first removing the build sheet from the machine and flexing the sheet. Once parts are removed from the build sheet, support material can be removed by breaking it off by hand using a chisel, scraper, pliers, or various other tools and picks.

SUP8000B is moisture sensitive and if the support is embedded in the model or is difficult to remove, the material is most likely wet. If it is left idle in the machine for more than 48 hours (even if the machine is printing model and not support material), especially in a humid climate or time of year, the canister should be unloaded and exposed filament discarded prior to reloading into the machine. This will help to prevent support oozing into the model material during printing.

Post-Processing

Antero 800NA can be sanded, painted, media blasted, bonded, machined, drilled, receive inserts and more, similarly to other FDM thermoplastics.

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