SLA Best Practices

SLA Best Practices Accura AMX High Temp 300C

Release Date: 3/4/2024

Original Instructions

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1 SLA BEST PRACTICES ACCURA AMX HIGH TEMP 300C INTRODUCTION

Accura AMX High Temp 300C has been developed to provide the highest heat resistance possible from an SLA material. This means that there are some attributes of the material that need to be accommodated in the workflow in order to successfully build parts and tune the workflow for best possible accuracy. There are differences between SLA platforms that define the required approach in each case.

2 SLA BEST PRACTICES ACCURA AMX HIGH TEMP 300C SPECIAL CONSIDERATIONS FOR SLA 750

Due to the higher laser power provided by the SLA 750 and SLA 750 Dual, special considerations need to be taken into account for some geometry. Geometry with sustained cross sections larger than 3.5mm should be oriented at compound angles and should be supported with denser-than-normal supports to help limit warp. For larger-cross-section parts, there is an **Accura AMX High Temp 300 Large Cross Section** build style. This build style will help limit warp on parts where large cross sections are unavoidable. However, with this build style, part quality will be slightly reduced.

3 SLA BEST PRACTICES ACCURA AMX HIGH TEMP 300C SOFTWARE CONSIDERATIONS

3.1 SLA Best Practices Accura AMX High Temp 300C Software Version

It is best to use the most current software version. To ensure compatibility with newly created build styles, use these versions or newer:

- Part-Preparation Software: Minimum recommended version is 3D Sprint ≥5.0.

3.2 SLA Best Practices Accura AMX High Temp 300C Part Building System Software Entries

Each material on a SLA system uses a specific material entry in the 3DPrint software. The entries contain the values for Dp and Ec used for each material. See the 3DPrint Users' Guides for details. The values for Dp and Ec are shown below.

Recommended Starting Parameters:

- Dp: 7.4
- Ec (mJ/cm2): 10.2
- Baseline Scale Factors (xyz): 1.0000, 1.0000, 1.0000
- Baseline Line Width Compensation Value: 0.0760 mm (0.0030 in.)
- Recommended vat temperature: 28°C

3.3 SLA Best Practices Accura AMX High Temp 300C Qualified Printer Types

Accura AMX High Temp 300C has been developed for the following 3D Systems® printers:

- ProJet 6000
- ProJet 7000
- SLA 750
- SLA 750 Dual

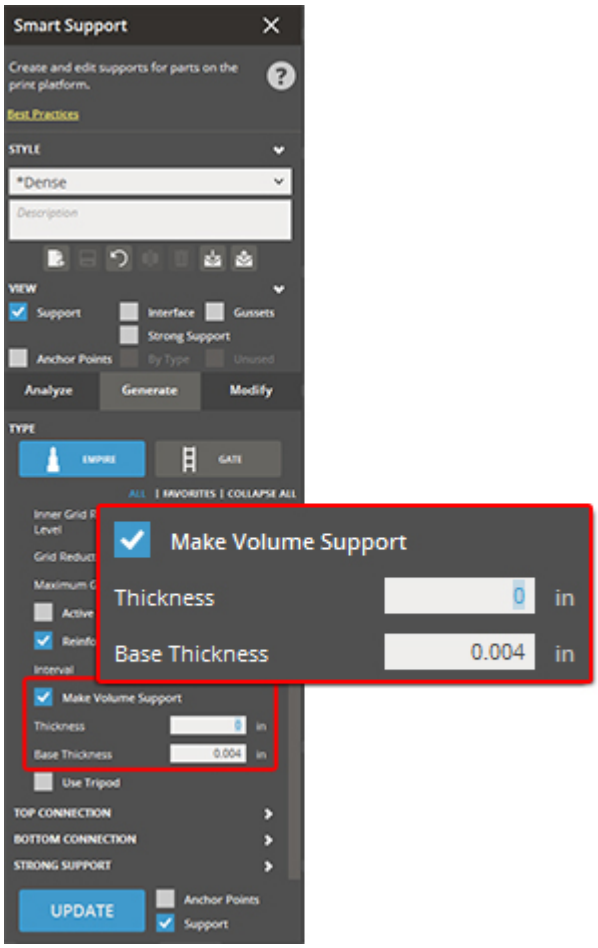
4 SLA BEST PRACTICES ACCURA AMX HIGH TEMP 300C CONSIDERATIONS FOR PRINTING

4.1 SLA Best Practices Accura AMX High Temp 300C Hatch Over-Cure

Hatch over-cure has been optimized for best part quality. It is highly recommended that the hatch over-cure values not be increased from default due to the heat generated during part building, resulting in part defects.

4.2 SLA Best Practices Accura AMX High Temp 300C Large Cross Section Parts

Accura AMX High Temp 300C is a material that is very susceptible to warp on larger cross section parts. It is recommended to orient large parts at angles to reduce the cross-sectional area. It is also a best practice on large cross section parts to use a Volumetric Support Base which can be defined in the Smart Support settings. In most cases only a Volumetric Support Base is needed, not volumetric support pillars or tips.



5 SLA BEST PRACTICES ACCURA AMX HIGH TEMP 300C POST PROCESSING

5.1 SLA Best Practices Accura AMX High Temp 300C Part Cleaning

Parts must have excess material removed prior to post-curing.

- Drain excess material from the parts to remove most of the uncured material.
- Immerse parts in TPM and agitate for 5-20 minutes. Time required will depend on geometry. It's important to make sure the parts are thoroughly clean of excess material.
- Remove parts from TPM and drain excess TPM back into your tank.
- Immerse parts in IPA and agitate for 5-10 minutes. Time required will depend on geometry. It's important to make sure the parts are thoroughly clean of excess material.
- Air dry parts. You may use compressed air (low pressure) to dry the part and remove liquid from crevices. In some geometry specific situations, compressed air used to dry parts can cause small fractures in the part due to shock cooling. To limit the shock-cooling effects, rinse the parts in clean, room-temperature water before air-drying them.
- For peak mechanical results, it is recommended to let parts completely dry before post-curing. This can be done at ambient temperature or in a low-temperature oven (35°C) at a recommended time of 30 minutes. If you use the PostCure 1050, the material recipe for Accura AMX High Temp 300 includes a drying cycle; therefore, no external drying oven is necessary.

5.2 SLA Best Practices Accura AMX High Temp 300C Support Removal

We recommend that supports be removed prior to post-curing the part. Post cured High Temp 300 supports are very rigid and can cause damage to your part when removing in some situations.

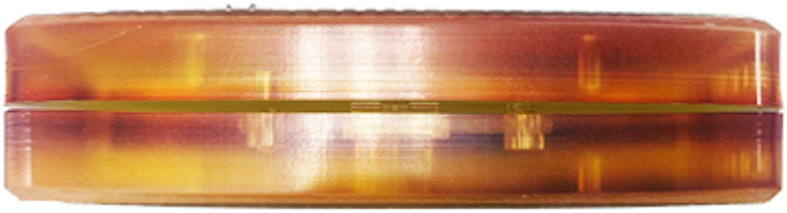
5.3 SLA Best Practices Accura AMX High Temp 300C UV Post-Curing

- Most geometries are self-supporting, but use good judgment based on your specific parts to determine if additional support is required during the post-curing operation. Take care when orienting parts in the post-curing apparatus to avoid sagging or other deformation.
- Post-curing in the PostCure 1050 is recommended for the most consistent mechanical results. There is a High Temp 300 cure recipe that should be used.
- For older ProCure units, 120 minutes of total cure time is needed. It is recommended to flip parts halfway through curing. It is best to limit the time the cure units doors are open while flipping parts to ensure the chamber stays warm to ensure best mechanical results possible. It is also recommended to partially block the extraction fan to help with increasing the chamber temperature.
- There is no need for thermal post cure to achieve >300°C HDT.

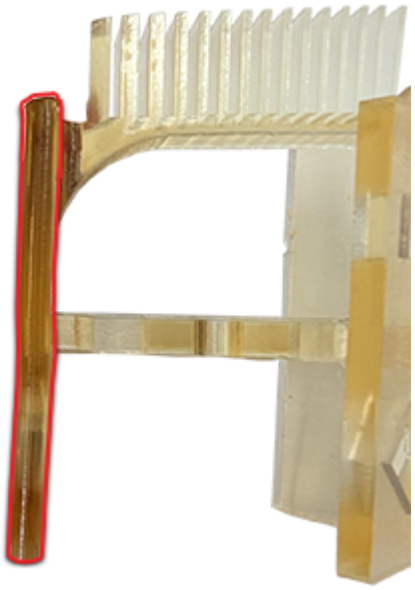
6 SLA BEST PRACTICES ACCURA AMX HIGH TEMP 300C PART DEFECT EXAMPLES

Accura AMX High Temp 300C can exhibit some part-quality defects on any printer; but specifically, large-frame, high-power printers (e.g. SLA 750) can be more susceptible to having defects. Below are some examples of defects.

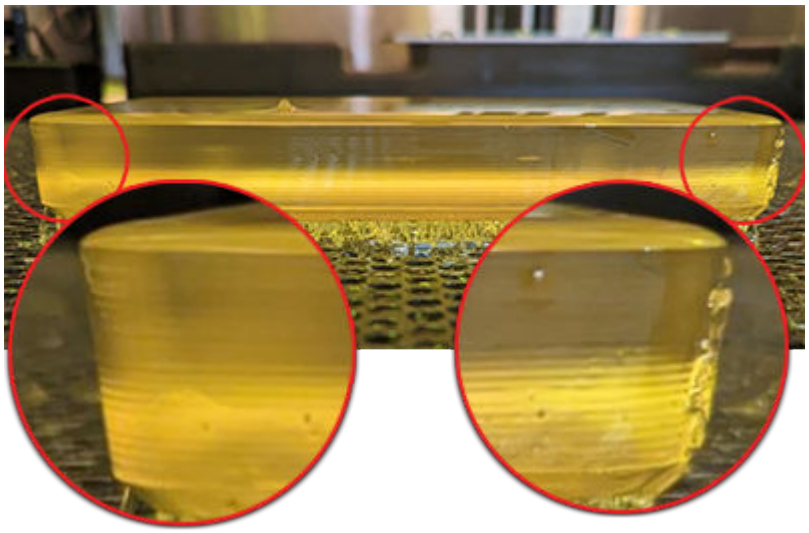
Thick cross section injection molding dies with flat mating surfaces that were printed flat on the SLA 750. Note the excessive curl exhibited between the mating surfaces. This can be prevented by changing the part orientation, as seen in Chapter 2 of this guide.



Test part that showcases the differential shrink characteristics of High Temp 300C. Note the flatness of the vertical sidewall where the horizontal cross section starts, significant differential shrink can be seen.



Large injection molding die printed flat with the SLA 750 large cross section build style. Note that there is still some warp even using the large cross section style which is to be expected with thicker parts.



7 SLA BEST PRACTICES AMX VS EPOXY CROSS-CONTAMINATION COUNTERMEASURES

If this material is being used in an environment where epoxy-based Accura resins are also being used, please be aware of the following:

Accura AMX denotes new, groundbreaking chemistry from 3D Systems®, Inc. that is advancing the capability of SLA prints, making way for new production-capable applications. Accura AMX materials are acrylate-based copolymers; whereas, Accura materials are epoxy-acrylate hybrids.

Accura and Accura AMX materials are not chemically compatible. It is of the utmost importance to ensure there is no cross-contamination between resins. If cross contamination occurs, AMX materials could render other materials useless.

Regardless of the combination of materials being run, 3D Systems® recommends maintaining strict housekeeping and cleanliness of the SLA workspace and hardware, including the post-processing facility. A work area that is kept clean and free from uncured resin, dust, debris, and other foreign materials (oils, greases, cleaning chemicals, etc.) provides better machine reliability and better final-part quality.

Items that are regular touch points like door handles, user interfaces, and loose equipment (scrapers, tweezers, etc.) should also be kept clean when not in use.

Accura AMX materials pose a higher risk of contaminating other materials, especially those that are epoxy-based. While it is possible to have machines running the different chemistries side-by-side, 3D Systems® recommends the following best practices:

- Store Accura AMX materials separately from standard Accura materials to prevent accidental mixing.
- Use dedicated workstations and storage areas for Accura AMX materials to avoid any accidental contact with Accura materials.
- Use dedicated build platforms for each material type.
- Use dedicated carts or platform-removing equipment for each material type.
- Set up separate cleaning stations for Accura AMX and Accura materials to prevent cross-contamination during the post-processing phase.
- Ensure that cleaning equipment, such as solvent baths and cleaning brushes, are distinct and labelled for specific material use.

By following these guidelines, you can minimize the risk of contamination when working with Accura AMX and standard Accura materials and ensure the integrity of your production processes.

In addition to these guidelines, it is also important with any prototyping or production workflow to ensure that there are clear and documented procedures for handling materials that include storage, handling, and disposal. The procedures should form parts of personnel training and any relevant safety assessments.

8 SLA BEST PRACTICES ACCURA AMX HIGH TEMP 300C CONTACT US

If you have questions about any processes in this guide, contact your regional customer support center. The regional contact information can be found on the 3D Systems website, www.3DSystems.com.

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Register Statement