



3D polymer

consumer selector guide



EASTMAN

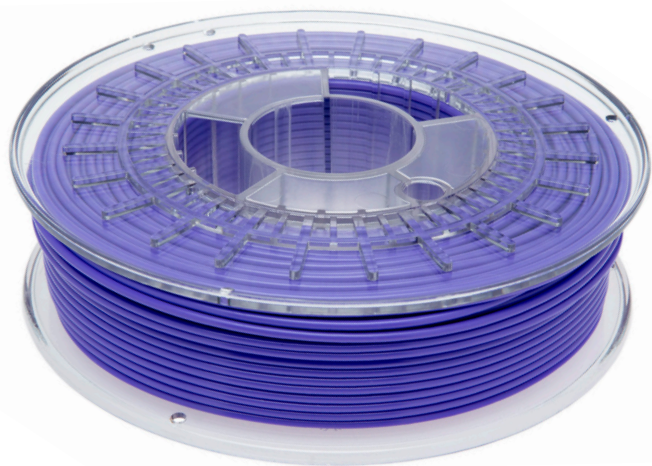
3D polymer selector guide

To help you keep up with the incredible advances in 3D printing hardware and software, you can now select from a variety of Eastman Amphora™ 3D polymers to match specific applications and end-user skill levels.

Amphora 3D polymers are low-odor, low-emission filaments you can use to create items that are more functional, durable, efficient, and attractive compared to items using acrylonitrile butadiene styrene (ABS) or polylactic acid (PLA).

- Unlike ABS, Amphora has no noticeable odor or styrene emissions.
- Unlike PLA, Amphora won't degrade at higher temperatures, ensuring a more uniform printer experience.

Amphora 3D polymers provide superior melt strength and dimensional stability to create strong, detailed prototype and functional parts across a wide range of applications and end-user skill levels.



Education

K-12 or higher education. Art class, shop class, or science lab. Low-odor, styrene-free Amphora 3D polymers are ideal for modern classrooms and emerging curricula.

DIY and hobbyists

With Amphora, you can create and print durable, more useful, better-looking items. Your creations will take people's breath away without taking away the air quality around the printer.

Commercial

- **Short-run manufacturing:** Compared to other filaments, Amphora 3D polymers retain the toughness of injection molding—without the need for more complex molding systems.
- **Replacement parts:** The superior toughness of Amphora provides engineering-grade performance and parts that can be printed cost-effectively with less support material.
- **Jigs and fixtures:** Toughness and processability of Amphora polymers allow manufacturers to quickly and effectively create custom fixtures to support their manufacturing process.

Information and tips on the following pages will help you match the best grade of Eastman Amphora™ 3D polymer to your needs and get outstanding results. Visit www.eastman.com/amphora for more information.

Which grade is right for you?

It's easy to find the best Amphora 3D polymer grade (AM1800, AM3300, or FL6000) for your printing environment and end-use applications.

Table 1. Select the filament for your application.

Application/end use	Visual prototype	Functional prototype	Functional part
Education	AM3300	AM1800 AM3300 HT5300 FL6000	AM1800 HT5300 FL6000
DIY	AM3300	AM1800 AM3300 HT5300 FL6000	AM1800 HT5300 FL6000
Commercial	AM3300	AM1800 AM3300 HT5300 FL6000	AM1800 HT5300 FL6000

When selecting the best grade for your needs, be sure to consider your 3D printing experience and skill level.

Table 2. Match the filament to your skill level.

Material/user skill level	Novice	Advanced
Amphora AM1800	No	Yes
Amphora AM3300	Yes	Yes
Amphora HT5300	No	Yes
Amphora FL6000	No	Yes



Prototyping



Education



Hobbyists



























Other applications









How do Amphora grades compare with other filaments?

Performance and printing characteristics of specific Eastman Amphora™ 3D polymers can be matched with application needs—and all compare favorably with ABS and PLA.

Table 3. Compare printing characteristics.

	Amphora AM1800	Amphora AM3300	Amphora HT5300	Amphora FL6000	ABS	PLA
Printing window						
Temperature resistance						
Printing odor	Not noticeable	Not noticeable	Not noticeable	Not noticeable	Very strong odor	Slight odor
Toughness						
Resistance to warping			 *	 *	 *	
Ability to print transparent parts	No	Yes	Yes	No	No	No
Printing skill required	Advanced	Basic	Advanced	Advanced	Advanced	Basic

*Managed with appropriate techniques

	= Below average	
	= Average	
	= Above average	
	= Exceptional	

How to get the best results with Amphora

Table 4 is a quick-reference guide to printer settings and ranges for Eastman Amphora™ 3D polymers—with helpful printing tips. Before printing, always consult your printer's manual and follow the recommendations of your filament provider.

Table 4. Guide to printing Amphora 3D polymers

Variables	AM1800 settings	AM3300 settings	HT5300 settings	FL6000 settings	Printing tips
Temperature*	240°–260°C	220°–250°C	250°–285°C	250°–260°C	Start at low temperature and increase 5° until desired flow and proper adhesion is established.
Temperature* for a heated bed	60°–70°C	65°–85°C	110°–120°C	60°–80°C on BuildTak®	<p>AM1800: Material should be tacky but not flowing. Allow the material to cool for easy removal.</p> <p>AM3300: For best adhesion, use a clear glass plate. Applying hair spray reduces the risk of pulling glass pieces from the surface.</p> <p>HT5300: Use an enclosed chamber to help retain ambient heat. Hair spray or a glue stick can help reduce sticking to the bed. For best results, use a matte-finished sticker to promote print adhesion and minimize warpage.</p> <p>FL6000: Start the print with a skirt to ensure optimal filament flow through the nozzle.</p>
Percent flow	100%–110%	90%–104%	100%–110%	100%–110%	<p>AM1800: Start the print with a skirt to ensure optimal filament flow through the nozzle.</p> <p>AM3300: Start first layer at 150% with a width of 120% and 40% speed. Start with a skirt.</p> <p>HT5300: Set first layer height at 120% with a width of 120% and 40% speed.</p>
Retraction distance*	4.5 mm	3 mm	3 mm	2.85 mm: 3–5 mm 1.75 mm: 0.5–1 mm	<p>AM1800: Experiment with printer to ensure optimal filament flow.</p> <p>AM3300: Use suggested retraction distance with a 0.3 mm coast and 0.3 mm vertical lift.</p> <p>HT5300: Use suggested retraction distance with a 0.14 mm coast and 0.2 mm vertical lift.</p> <p>FL6000: When printer allows retraction adjustments, adjust retraction speed and distance to maximum values that can be mechanically tolerated.</p>
Retraction speed	45 mm/sec	45 mm/sec	40 mm/sec	30 mm/sec	Experiment with your printer as necessary to determine optimal retraction settings.
Printing speed	35–50 mm/sec	40–60 mm/sec	30–50 mm/sec	2.85 mm: 30–50 mm/s 1.75 mm: 20–30 mm/s	<p>Do not print too fast. Allow the material time to effectively stick to the build plate and first layers.</p> <p>AM3300: Printing speed is typically similar to PLA setting on most machines.</p> <p>HT5300: Slower print speeds will yield tougher parts.</p>

Table 4. Guide to printing Amphora 3D polymers (*continued*)

Variables	AM1800 settings	AM3300 settings	HT5300 settings	FL6000 settings	Printing tips
Layer height	0.1–0.4 mm	0.15–0.20 mm	0.10–0.20 mm	0.1–0.4 mm	Monitor the first layer to make sure no material sticks to the nozzle and accumulates. If the first layer has no buildup or skips in the layer, the rest of the print should be successful. AM3300/HT5300: Height ranges are for a 4 mm nozzle.
Cooling fan	Engage cooling at 100% between 3rd and 5th layer.	Engage cooling at 60% after layer 4.	0%–50%	0%–50%	Recommended for regular print jobs requiring an average strength and speed. For best possible strength, it is advised to print with as little cooling as possible. AM3300/HT5300: This percent varies from printer to printer. Be careful using too much cooling; this combined with low print temperature and high speed could result in layer delaminating prints.
Best bridging	Slow printing 10–20 mm/sec with max. cooling fan	60 mm/sec with 100% cooling	Slower speed with 100% cooling	Slow printing with increased fan	Plan to run the fan at 100% during bridging operations when attempting to print overhangs or gaps without physical support. AM3300/HT5300: If bridging is done too quickly, break melt will occur. However, if done too slowly, layers will start sagging.
Finish	Cool bed to less than 40°C.	Cool bed to less than 40°C.	Cool bed to less than 40°C.	Cool down to 40°C and then reheat to 60.	Minimize print distortion and allow easier removal by cooling before attempting to remove the print from the bed.

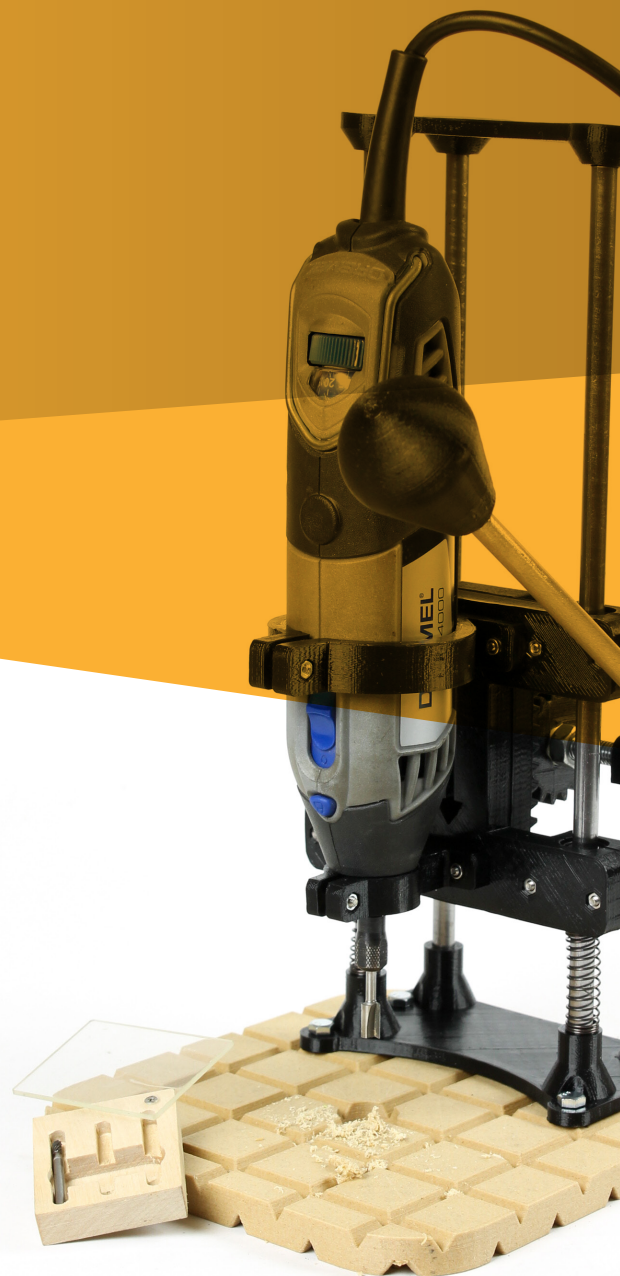
**Different printers may require slightly different temperature settings and different retraction distance. Follow the 3D printing instructions from the printer manufacturer.*

CAUTION: SERIOUS INJURY MAY OCCUR IF 3D PRINTERS ARE MISUSED OR IF THE FILAMENT, PRINTER, OR 3D PRINTS ARE TOUCHED DURING OPERATION OR HANDLED IMPROPERLY.

Always follow ventilation procedures recommended by your printer manufacturer.

For a list of Amphora filament suppliers, visit us at
www.Eastman.com/Amphora.





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