

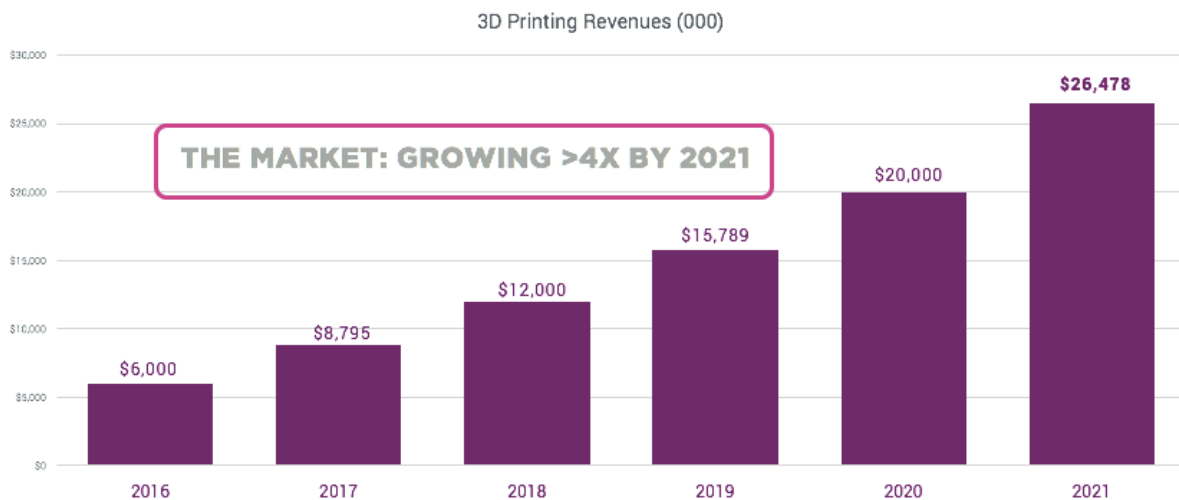


# 10 Ways to Ensure a Commercial 3D Printer is Truly a Commercial 3D Printer

A light gray triangle is located in the bottom right corner of the page, pointing upwards and to the right.

## INTRODUCTION

With the deafening burst of the consumer/hobbyist 3D printing bubble, some large companies that previously offered a low-cost line of 3D printers targeting this audience wisely abandoned those lines in favor of large, expensive, industrial-class manufacturing 3D printers suitable for additive manufacturing lab environments. After all, every reputable analyst covering the 3D printing space predicts fast and massive growth in the industrial and manufacturing 3D printing sectors.



*Forecasted growth of professional 3D printer market. Source: Wohlers Associates, Inc.*

Yet other companies took a different approach. These companies didn't change their machines at all. For them, the shift has been purely one of marketing, where they are promoting and selling their hobby-class printers, previously marketed as consumer 3D printers, as low-cost, professional-grade 3D printers. Still other companies have made some minor changes to their hobby-class machines and software and labeled them professional 3D printers, more for marketing impact than meaningful capabilities that will benefit the typical industrial user.

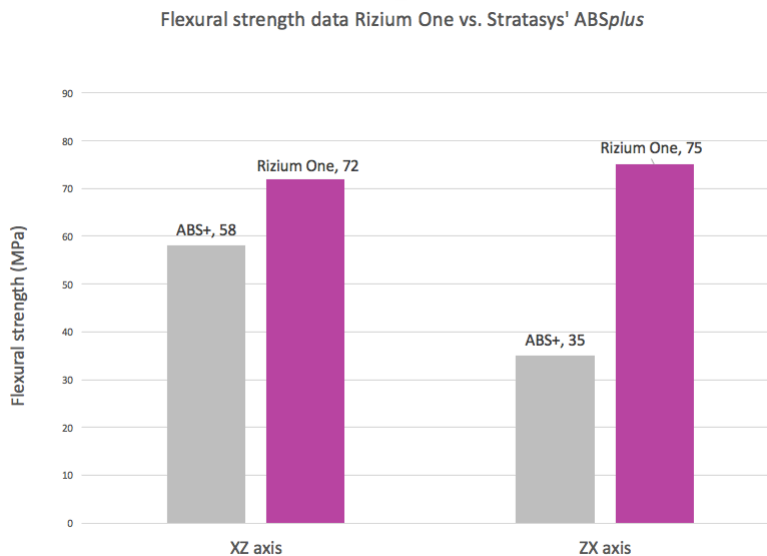
So, how can you discern the difference between a hobby-class 3D printer and a true, industrial-class system and why is it so important?

# TEN WAYS TO ENSURE A COMMERCIAL 3D PRINTER IS TRULY A COMMERCIAL 3D PRINTER

## 1. Z-STRENGTH

Any given part is only as strong as its weakest point. Be sure to ask for third-party material strength metrics. Pay special attention to the Z-axis strength of the material and how it compares to that of the X and Y axes, and then compare it to those of commercial systems.

It matters. Z-directional strength is impacted by the strength of the internal bond between the layers of a part. Most 3D printing technologies are unable to create parts that are as strong in the Z axis as they are in the X and Y axes due to weak bonds that form between each layer of material.



*Rize parts are isotropic, stronger than polycarbonate and twice as strong as ABSplus.*

For example, typical professional-grade FDM parts, lose around 40-percent of their Z-strength and are therefore not isotropic or strong enough for some industrial applications. Hobby/consumer class 3D printers perform even worse, making those parts unsuitable for most commercial 3D printing and additive manufacturing applications.

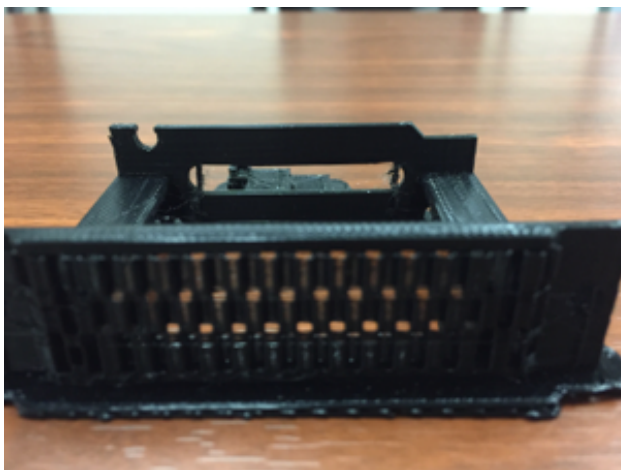
## 2. MATERIAL PROPERTIES

Depending upon your application or potential applications, the properties of the material used by the 3D printer and the potential for that printer's technology to use materials with different capabilities are very important. For example, with virtually all of today's hobby-class 3D printers - and even many commercial 3D printers - the existing material capabilities and potential capabilities accommodated by that technology, are very limited. Do you need watertight parts or rubber parts? Do you need parts that can have variable material properties at specific locations on the same part? How about conductive, thermo-conductive and thermos-insulating materials? Be sure to ask the right questions and determine if the current and future material properties for the 3D printer and its technology will meet your commercial needs.

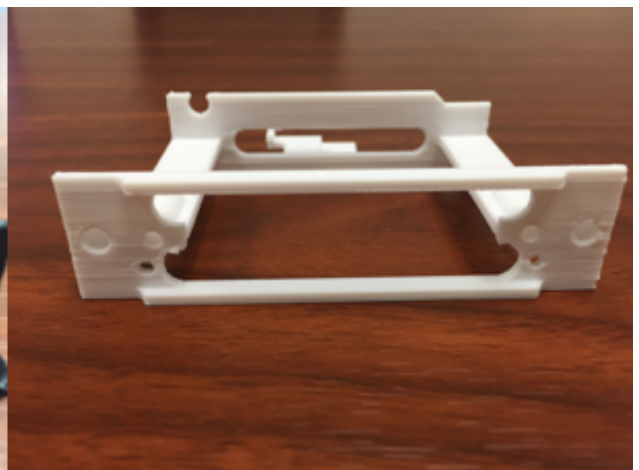
## 3. PART QUALITY

Remember the old adage, "You get what you pay for?" This generally holds true for low-cost 3D printers.

Learn the resolution that will suit your application needs and ensure the 3D printer can deliver that resolution. Yet, part quality involves much more than resolution alone. In fact, for many of your applications, you might not need the ability to achieve a particularly high resolution. There are other factors to consider, such as smooth surfaces, types of geometries you need to produce (i.e.; fine detail, tiny holes and internal geometries), text, images and photorealistic color. Hobby-class 3D printers are unable to achieve these attributes.



**Hobby 3D Printer**  
"Spaghetti" in holes, missing geometry, fragile, can't remove support



**Rize One**  
Complete geometry, removed support in seconds, isotropic, stronger, watertight

Ask to have one of your typical parts 3D printed on the 3D printer you are considering, several times in fact, to see how well the 3D printer can print your part and to assess the consistency of the geometry it can produce.

#### 4. POST-PROCESSING METHOD

All 3D printers, from the lowest-cost hobby-class 3D printers to the most expensive additive manufacturing systems, require some sort of post-processing after 3D printing in order to produce a usable part. Hobby-class 3D printers tend to use “breakaway supports.” It sounds easy, yet it’s anything but. Given that the parts aren’t strong to begin with, small geometries on the part can’t withstand the breakaway action and often simply break when the supports are removed. This method also prevents support removal from small orifices in the geometry, rendering the part unusable for commercial applications. So, returning to our discussion about resolution, even if the hobby-class 3D printer offers high resolution, the part is ruined or unusable after its breakaway supports are removed.



*The part is often easily ruined or unusable after its breakaway supports are removed.*

#### 5. PRINTER RELIABILITY

Industrial 3D printer users often operate their machines around the clock, 7 days a week, 365 days a year. They rely on these systems to do their jobs, help colleagues do their jobs, keep the assembly line running and bring increasingly innovative products and services to market before the competition. It is simply unacceptable to repeatedly experience 3D printer downtime due to broken machines with cheap components. And it is too costly to have expensive engineering labor spend time fixing machines. Hobby-class printers are not designed for the rigorous needs of an industrial user.



*Consumer/hobby-class 3D printers are not suitable for rigorous industrial use.*

Be sure to research service, repair and reliability information for the 3D printer you're considering. Ask about warranties and service plans. At a minimum, insist on seeing the 3D printer in person. Look inside and feel and manipulate the components to ensure they are tough and durable. If the 3D printer looks and feels flimsy, it is.

## 6. BUILD VOLUME

Make sure the 3D printer's build bed is large enough to accommodate the majority of industrial parts. Most commercial parts, approximately 80%, fit within a 12" x 8" x 6" (300mm x 200mm x 150mm) build volume. If the printer's build volume is any smaller, it won't accommodate the majority of the parts you need to produce. Build volume alone, though, shouldn't be the sole criterion for selecting a commercial 3D printer, as some hobby-class printers have recently upsized in order to call themselves professional systems.

Also ensure that the system you are evaluating can 3D print multiple parts (same or different part) simultaneously in a single build. This will increase the throughput that is so critical in a commercial setting.

## 7. PROCESS

Hobby-class 3D printers tend to use FFF (Fused Filament Fabrication) and FDM (Fused Deposition Modeling) 3D printing technology as a result of expired patents. As such, true innovation simply isn't possible in these systems that must also keep the cost of goods down in order to offer low-cost machines.

## 8. SOFTWARE

Hobby-class 3D printer software typically ranges from open source to never mentioned. While open source sounds noble, it is important, particularly in demanding commercial environments, for software to be designed to work in

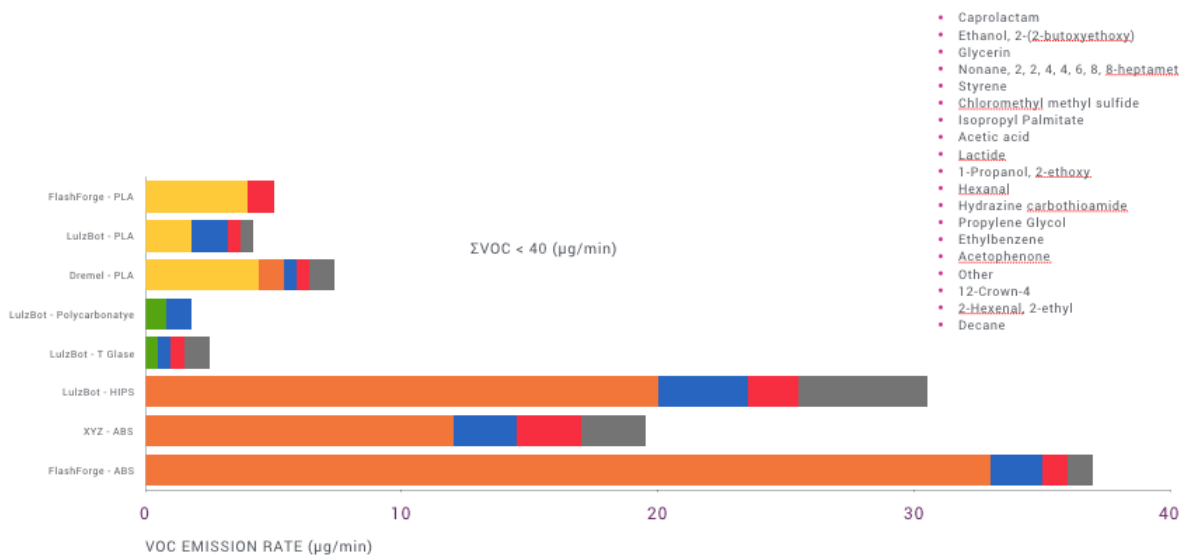
perfect harmony with the materials and hardware for optimum performance, something that best lends itself to close, in-house collaboration between highly experienced 3D printing software developers, material scientists, mechanical engineers and firmware experts. In commercial-class 3D printing processes, software innovation is as critical and described as the printer itself.

## 9. TEAM EXPERIENCE AND EXPERTISE

Research or ask for the bios of the lead engineers, material scientists and software developers. If they are producing a truly commercial-class system, they will have had significant prior experience developing commercial-class systems at reputable 3D printing companies. Even better, look for a team with numerous commercial 3D printing patents. It is unlikely that a team who has not had such experience or pioneered such technology can develop a truly robust commercial-grade system.

## 10. SAFETY

Did you know that 3D printers, including consumer/hobby-class desktop 3D printers, emit toxic particles and/or involve chemicals or materials in the process that are unsafe unless properly stored, used and disposed of in a specially-equipped facility? It is one of the dirty little secrets of 3D printing. If you plan to use a 3D printer in a typical office setting, it must emit no toxic particles, or use any harmful materials and chemicals throughout the process, from file to usable part.



*A recent Illinois Institute of Technology study reveals toxic particle emissions among desktop 3D printers.*



## CONCLUSION

Industrial-class 3D printers do not need to be relegated to the additive manufacturing lab environment. Rize™ One - with its isotropic material properties stronger than polycarbonate and two times stronger than *ABSplus*, color 3D printing and zero post-processing capability - is the first industrial-grade 3D printer that breaks the chains of the lab, existing as comfortably and safely in an engineer's and doctor's office, auto repair shop, aircraft, ship or on the manufacturing floor as it does in the additive manufacturing lab.



## ABOUT RIZE

Rize is unlocking 3D printing for new markets and driving the next wave of innovation and advancement in manufacturing with our patented APD (Augmented Polymer Deposition) technology that is the only efficient means to 3D print one-offs of injection molded-quality parts on demand. Our deeply experienced team of former Z Corporation, Objet and Revit materials, hardware and software experts, with over 20 patents, is fulfilling an unmet need for a completely office-safe and affordable 3D printing platform that can be used successfully across a wide variety of commercial applications, including, production parts, tooling, fixtures and jigs and customized end-use products. <http://rize3d.com>



<https://www.rize3d.com>

© 2016 Rize Inc. All rights reserved. Rize, the Rize logo, APD and Rizium are pending trademarks or registered trademarks of Rize Inc. All other company and product names are pending trademarks or registered trademarks of their respective holders.