MakerBot

2022 GUIDE TO 3D PRINTING MATERIALS

Now including over 25 engineering materials:

- [x] Metals
- [x] Composites
- [x] Polymers

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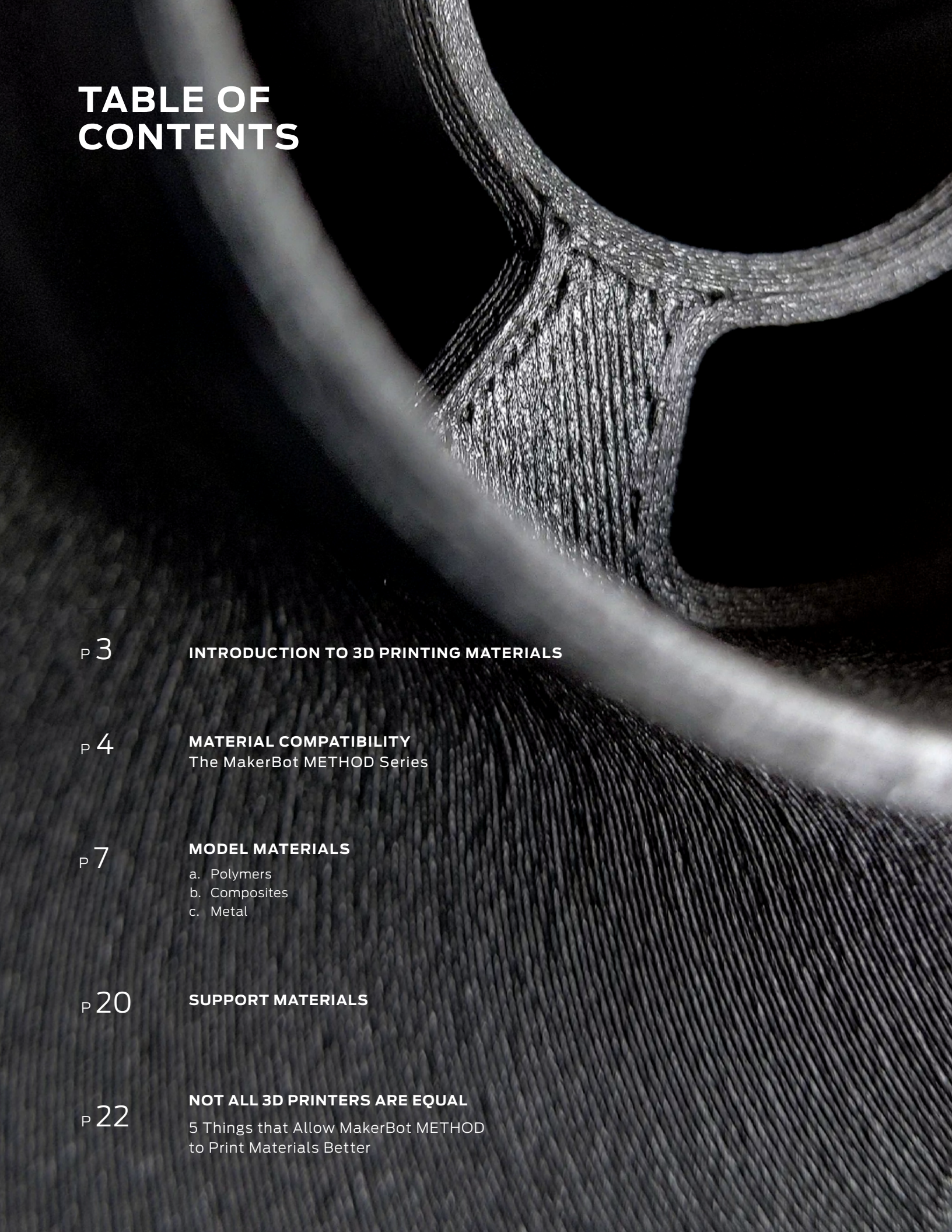


Introduction to 3D Printing Materials

In 1989, the first FDM (Fused Deposition Modeling) 3D printer was invented and, with it, the dawn of an era of possibilities for product design and manufacturing. The first material for that printer was a mix of wax and plastic. Over the next 30 years, material scientists developed a range of new and exotic materials, while hardware and software advancements in 3D printing enabled the use of these new materials. Most of the early 3D printers and materials developed were only available to companies who could afford their six-figure (or more) price tags, but recently there has been a renaissance in which major material manufacturers are flocking to the space. With that popularity, a wealth of new materials are being developed and optimized for 3D printers.

While some of these materials print spectacularly, others still have a ways to go in terms of reliability, print quality, or material performance. Some materials are extremely affordable and others can be costly. With all of these options and variables, it can be daunting to someone who is relatively new to 3D printing. For that reason, we've created a guide that will take you through the ins and outs of FDM 3D printing materials, when to use them, and what to expect along the way.

Material Compatibility: The MakerBot METHOD Series

When it comes to FDM 3D printers such as the MakerBot METHOD users gain unmatched flexibility to jump between polymers, composites, and now even metals. On the METHOD platform alone there are 25 materials (and counting) that users can choose from to ensure that they always have the right material for the job at hand. With dual extrusion, you have the ability to introduce dissolvable supports, enabling even more complex geometries. And with MakerBot LABS, users can leverage an unlimited sea of third-party materials - including those verified through the LABS program and listed here!

MAKERBOT MODEL MATERIALS

Polymers

PLA

Extruder Material Extruder 1
Printer METHOD, METHOD X

TOUGH

Extruder Material Extruder 1
Printer METHOD, METHOD X

PETG

Extruder Material Extruder 1
Printer METHOD, METHOD X

ABS

Extruder Material Extruder 1XA
Printer METHOD X

ABS-R

Extruder Material Extruder 1XA
Printer METHOD X

ASA

Extruder Material Extruder 1XA
Printer METHOD X

NYLON

Extruder Material Extruder 1
Printer METHOD, METHOD X

PC-ABS

Extruder Material Extruder 1XA
Printer METHOD X

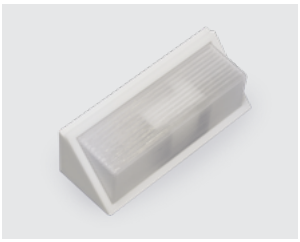
PC-ABS FR

Extruder Material Extruder 1XA
Printer METHOD X

JABIL TPE SEBS

Extruder LABS GEN 2
Printer METHOD, METHOD X

MITSUBISHI DURABIO



Extruder LABS GEN 2
Printer METHOD X

POLYMAX PC

Extruder LABS GEN 2
Printer METHOD X

PC-PBT

Extruder LABS GEN 2
Printer METHOD X

POLYMAX FR

Extruder LABS GEN 2
Printer METHOD X

POLYLITE

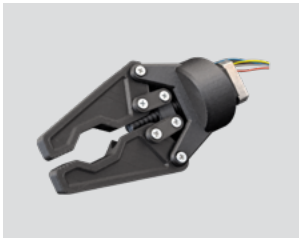
Extruder Material Extruder 1
Printer METHOD, METHOD X

Composites

NYLON CARBON FIBER

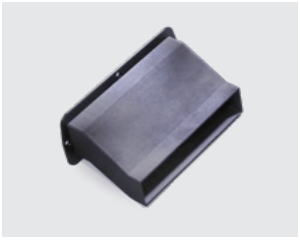
Extruder Material Extruder 1C
Printer METHOD, METHOD X

N12 CARBON FIBER



Extruder Material Extruder 1C
Printer METHOD, METHOD X

PETG CARBON FIBER



Extruder LABS GEN 2
Printer METHOD, METHOD X

ABS CARBON FIBER

Extruder LABS GEN 2
Printer METHOD X

PETG ESD

Extruder LABS GEN 2
Printer METHOD, METHOD X

ABS KEVLAR

Extruder LABS GEN 2
Printer METHOD X

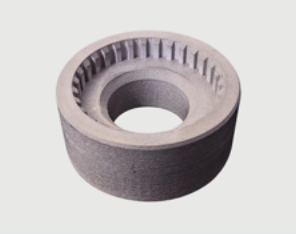
ABS EC

Extruder LABS GEN 2
Printer METHOD X

ABS ESD

Extruder LABS GEN 2
Printer METHOD X

BASF ULTRAFUSE 316L STAINLESS STEEL



Extruder LABS GEN 2
Printer METHOD, METHOD X

MAKERBOT SUPPORT MATERIALS

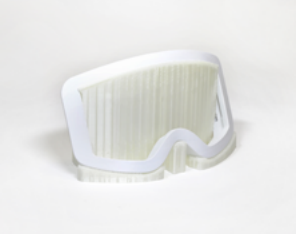
RAPID RINSE

Extruder Support Extruder 2XA
Printer METHOD X

SR-30

Extruder Support Extruder 1XA
Printer METHOD X

PVA



Extruder Support Extruder 1
Printer METHOD, METHOD X

Model Materials

from Polymers to Composites to Metals

The model material is simply the material that you want your final part - whether it's a prototype, a tool, or a working product - to be manufactured in. In the case of FDM 3D printing with the MakerBot METHOD Series we categorize these materials into three families - polymers, composites, and metals.

POLYMERS

PLA

Fast, Easy, Rigid

PLA (polylactic acid) is a great material for early concept models because it is easy to use, office-friendly, and works well with breakaway supports which print faster and can be removed faster than dissolvable supports. PLA is a corn-based plastic and is considered biodegradable under industrial processes. PLA is strong in tensile strength and modulus relative to other base polymers, which may be surprising to some because it is generally viewed as a fairly basic material. One potential downside of PLA is its brittleness – if it fails, it fractures catastrophically whereas some of the other polymers may bend.

Parts: 3D Laser Scanner
Support: Breakaway Support
Print Time: 23h 58m

TOUGH MATERIAL

Fast, Easy, Durable

Tough is a relatively new category of material that has a PLA base with modifiers to increase its tensile modulus to make it more impact-resistant. The combination of ease of use, office-friendliness, and durability / machinability make it great for mid-stage prototypes. Tough has an incredibly high elongation before break making it highly durable – this can be seen when printing extremely thin living hinges, which can be bent back and flexed many times before breaking. While highly durable, Tough can lack the higher quality surface and detail finish of both PLA and ABS.

Parts: Mouse
Support: PVA
Print Time: 26h 31m

PETG

Chemical Resistant, Durable

PETG's (glycol-modified polyethylene terephthalate) chemical resistance makes it a choice material for liquid containers and bottles, which also makes it great for prototyping those types of products. While available in a range of colors, PETG's glycol addition removes haziness to give it a nice translucence. The glycol also increases the strength and heat-resistance compared to PET. In addition to containers, the liquid / chemical resistance can benefit a range of uses from the machine shop to the lab.

This vacuum nozzle was printed as an attachment for a shop vac for removing waste material from a CNC machine. PETG is a great choice for this application due to the material's chemical resistance to the CNC coolant.

Parts: Vacuuming Nozzle
Support: PVA
Print Time: 11h 23m

ABS

Smooth, Durable, Heat-Resistant

ABS (acrylonitrile butadiene styrene) is one of the most popular materials for injection molded consumer products due to its clean surface finish, durability, and heat resistance. For this reason, it is often used for prototyping consumer products that will later be injection molded. By using ABS, the prototype is more likely to look, feel, and perform like the final product. ABS's durability and high heat deflection temperature also make it a good material for use in the lab or on the factory floor.

Parts: Thermocouple Thermometer
Support: Stratasys® SR-30
Print Time: 16h 16m

ABS-R

Strong, Durable, Heat-Resistant

ABS-R is a newer formulation of ABS with improved performance characteristics and reliability. It was developed specifically by MakerBot to be compatible with RapidRinse - a water soluble material that reduces post-print dissolution time from hours to minutes. In testing ABS-R has shown to increase print reliability from the already reliable ABS by 98%. Like ABS, ABS-R is a choice material for prototyping in advance of injection molding production with ABS, but is also durable and can be used for end use parts.

Parts: Water Impeller
Support: RapidRinse
Print Time: 13h 12m

ASA

UV and Weather Resistant, Durable

ASA (acrylonitrile styrene acrylate) combines the qualities of ABS with the added benefit of UV resistance and additional moisture resistance, making it ideal for equipment exposed to sunlight and rain over long periods of time – such as products for the agriculture, transportation, and power and utility industries. Because the use of ASA is fairly common in production parts for these industries, the prototyping of the same parts in ASA allows test engineers to better understand how their products will hold up in extreme weather conditions. In the field, a utility worker or a farmer could benefit from printing replacement parts as needed for broken equipment.

Parts: Electrical Outlet Cover
Support: Stratasys® SR-30
Print Time: 4h 29m

NYLON

Abrasion-Resistant, Strong

Nylon's ability to withstand high temperatures and its durability combine to give it above average abrasion resistance. While the storage of replacement parts can be costly, the ability to instead store the CAD file and print the parts as needed is an alternative that can save space and provide flexibility. Gears take consistent punishment and high abrasion, making Nylon an ideal material for this type of part.

Parts: Conveyor Gear
Support: PVA
Print Time: 10h 19m

PC-ABS
Durable and Heat Resistant

PC-ABS might seem like a composite, being that it is a mix of two polymers (polycarbonate and ABS), but the classic definition of a composite for 3D printing materials tends to refer to a polymer that has been reinforced with a solid particle (fibers, glass beads, etc.). If you use ABS, you might want to check out PC-ABS. It has many of the properties that make ABS desirable with added strength and heat-resistance beyond the range of regular ABS and thus is a common material used in the automotive industry.

Parts: Train Car Handle
Support: SR-30
Print Time: 14h 01m

PC-ABS FR
Durable, Heat Resistant, and Flame Retardant

Preventing or slowing the spread of fire can be important in many testing or end-use applications. By modifying a base polymer like PC-ABS, it is possible to 3D print parts that are not only strong, but also have extinguishing properties that prevent flames. FR is an important characteristic for parts made for the automotive, railway, and aerospace industries.

Parts: A/C Outlet
Support: SR-30
Print Time: 8h 46m

JABIL TPE SEBS 1300 95A LABS

TPE SEBS 95A is a soft material great for prototyping where rubber-like or elastomeric properties and durability are required. TPE SEBS 1300 95A is slightly firmer than TPE SEBS 1300 85A for application requirements that call for flexibility but also need more rigidity to achieve the optimal finished part performance. This type of material is great for applications such as overmolds, soft jaws, and endstop bumpers.

Parts: Flexible Pipe
Support: PVA
Print Time: 8h 20m

MITSUBISHI DURABIO LABS

DURABIO™ combines most of the advantageous properties of Polycarbonate (PC) and those of the Polymethacrylate (PMMA), with additionally the bio origin of raw material. DURABIO's translucence makes it great for applications such as switch housings with embedded LEDs.

Parts: Light Diffuser
Support: SR-30
Print Time: 9h 37m

POLYMAKER POLYMAX PC LABS

PolyMax™ PC (polycarbonate) is an engineered PC filament combining excellent strength, toughness, heat resistance and printing quality. Polycarbonates are popularly used in industries from consumer electronics to automotive thanks to their ease of injection molding and strength.

Parts: CNC Impeller
Support: SR-30
Print Time: 7h 27m

POLYMAKER PC-PBT LABS

Polymaker™ PC-PBT is a PC/PBT polymer blend which offers good heat resistance and toughness at temperatures down to -30˚C (-22ºF). Polymaker™ PC-PBT also features good chemical resistance.

Parts: Rear View Mirror
Support: SR-30
Print Time: 17h 26m

POLYMAKER POLYMAX PC-FR LABS

PolyMax™ PC-FR (flame retardant), can achieve V0 performance in the UL94 flame retardancy test and displays excellent toughness, strength and heat resistance. This filament opens new applications in the transportation industries such as automotive, railway and aerospace which often have FR safety requirements for parts.

Parts: Cable Holding Jig
Support: SR-30
Print Time: 4h 12m

POLYMAKER POLYLITE PC LABS

PolyLite™ PC is produced using a polycarbonate resin specifically engineered for 3D printing. It delivers good stiffness and heat resistance with light diffusing properties, making it great for applications that require embedded LEDs.

Parts: Lamp Shade
Support: SR-30
Print Time: 14h 58m

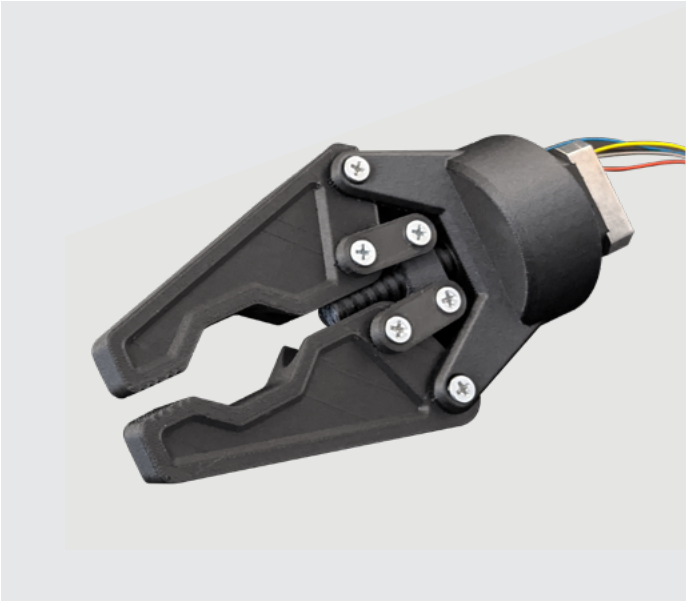
COMPOSITES

NYLON (6/66) CARBON FIBER

Nylon 6 Carbon Fiber has the strength and lightweight benefits of other carbon fiber composites. The main thing about Nylon 6 that sets it apart from others in that category is its ability to withstand higher temperatures. The heat deflection temperature is significantly higher than many of the popular base polymers. In the case of MakerBot Nylon Carbon Fiber, the HDT is 100ºC higher than that of ABS and 93ºC higher than regular Nylon 6.

Parts: Sprinkler System Attachment
Support: SR-30
Print Time: 8h 05m

NYLON 12 CARBON FIBER



Much like Nylon 6 Carbon Fiber, the Nylon 12 variant has the benefits of strength, stiffness, and lightweight. Unlike Nylon 6, Nylon 12 has a better resistance to moisture uptake, making it somewhat easier to print and giving the printed part a cleaner final appearance without the need for post-processing. One drawback of Nylon 12 compared to Nylon 6 is it will generally have a lower HDT - so you really just need to weigh what is most important for your specific application.

Parts: Mechanical Gripper
Support: SR-30
Print Time: 19h 29m

KIMYA PETG CARBON FIBER LABS

Kimya PETG Carbon Fiber 3D filament is a mixture of PETG and carbon fibers. The addition of carbon fibers to PETG provides high levels of mechanical performance. Thanks to its rigidity, the PETG Carbon is highly valued in the production of special parts, notably in the paramedical and automotive fields.

Parts: Vent Outlet
Support: SR-30
Print Time: 8h 46m

KIMYA ABS CARBON FIBER LABS

Kimya ABS Carbon Fiber 3D filament belongs to the styrenic polymer family. ABS Carbon is a mixture of ABS and carbon fibers. The carbon fibers give the filament improved rigidity compared to a standard ABS. This filament is highly valued by manufacturers of drones and by modeling aficionados. It is also used to make tools.

Parts: Gripper Jaws
Support: SR-30
Print Time: 12h 21m

JABIL PETG ESD LABS

ESD (Electrostatic Dissipative) is a property that reduces static electricity in order to protect electrostatic-sensitive devices, or to contain flammable liquids or gases. Through modifications in chemistry, and the addition of a solid particle such as Carbon Black, 3D printing base polymers, such as PETG, can take on ESD characteristics, making them ideal for creating test fixtures or housings for circuit boards.

Parts: PCB Holder
Support: SR-30
Print Time: 6h 20m

KIMYA ABS KEVLAR LABS

Kimya ABS Kevlar 3D filament is a composite filament enriched in aramid fibers - the same fibers used in bullet-proof vests. It offers strength and durability properties that are superior to a standard ABS. It provides the printed parts with increased resistance to abrasion. It is commonly used for finished parts and tools.

Parts: Punching Jig
Support: SR-30
Print Time: 11h 23m

KIMYA ABS-EC LABS

Kimya ABS-EC (electrically conductive) 3D filament is a combination of Acrylonitrile Butadiene Styrene and electrically active additives: carbon nanotubes that allow it to conduct electricity. ABS-EC is resistant to impact, heat and ageing. It is used in the automotive and electronics industries.

Parts: Discharge Base
Support: SR-30
Print Time: 7h 32m

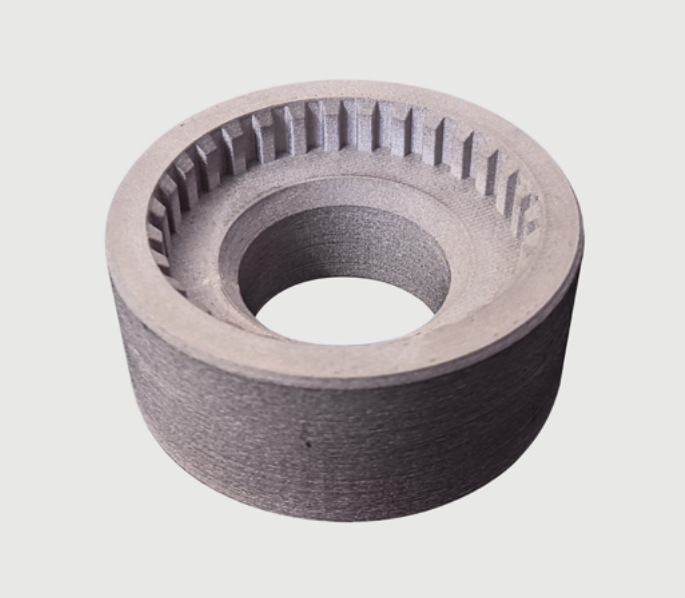
KIMYA ABS ESD-S LABS

Kimya ABS-ESD 3D filament is an Acrylonitrile Butadiene Styrene to which an additive has been added to give it Electrostatic Discharge properties: this material protects against electrostatic discharge. It also provides good impact resistance. It is a lightweight and rigid material that is also easy to print. It is ideal for creating test fixtures or housings for circuit boards.

Parts: RPI Case
Support: SR-30
Print Time: 10h 28m

METALS

BASF ULTRAFUSE 316L STAINLESS STEEL



Ultrafuse 316L is a unique FDM material that allows for users to produce real, solid 316L stainless steel parts. In filament form it is a bound material (ie. metal powder suspended within an ABS-like polymer). This allows for relatively easy use with FDM 3D printers such as the MakerBot METHOD. Upon completion of the print, a green part must then go through a debinding and sintering process in which the binder material is removed, and the remaining metal material is sintered together to form the final solid metal part. The resulting part can withstand forces and temperatures far beyond the threshold of polymers or composites, making it an extremely valuable option for certain end parts.

Parts: Planetary Gear Hub
Support: n/a
Print Time: 10h 15m

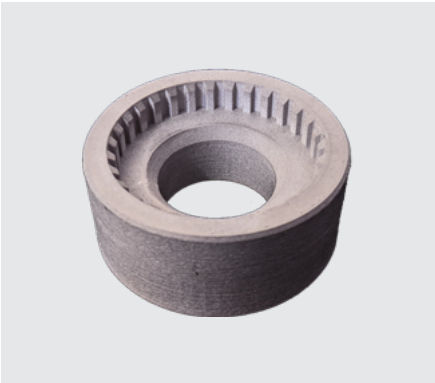
Metal 3D Printing Process

PRINT

Launch your print from anywhere via MakerBot CloudPrint to your personal or team-shared METHOD 3D printer equipped with a LABS GEN 2 Extruder and BASF Ultrafuse 316L material.

SEND IN YOUR GREEN PART

Once your “Green” part is complete, send it in to your sintering service provider such as Matterhackers where parts are debinded and sintered in a high heat, pure hydrogen atmosphere resulting in pure 316L Stainless Steel.



RECEIVE SOLID METAL PART

You receive the solid steel part in as little as 5 days - up to half the time and the cost of a typical 3D printing service bureau. Install the part as needed or incorporate with other printed parts in MakerBot composites and polymers for a more dynamic assembly.

Support Materials

Enabling the most complex geometries

Whether you're working with FDM, SLA, SLS, or another type of 3D printer, unless you're printing in space, you have to account for gravity. If you're printing something like a solid cube, this isn't really an issue because each layer has a corresponding layer beneath it for support. But what if you have an object that has portions of the model that are essentially floating in midair with no structure directly underneath them? This is where removable supports come into play. Depending on the type of FDM 3D printer you are working with, there are a few good options you can use.

RAPIDRINSE

Tap-Water Soluble Support Material for ABS

Print dimensionally accurate ABS parts with the ease of PLA. Print your parts with confidence in ABS-R and RapidRinse™, drop your part into tap water, and watch the supports dissolve to nothing in just minutes.

Parts: Gear with Extended Shaft
Support: RapidRinse
Print Time: 4h 33m

ABS, FINALLY AS EASY AS PLA

With our proprietary RapidRinse™ support achieve incomparable ABS parts with unprecedented ease.

TAP WATER SOLUBLE

Forget the cumbersome wash tanks and chemicals, RapidRinse™ dissolves in pure tap water so it's easy to use in just about any environment.

DISSOLVES IN MINUTES*

You don't have time to wait around while your print dissolves, so we've engineered RapidRinse™ to dissolve faster than PVA and competitive high-temp dissolvable support materials.

*Dissolution time may vary based on part geometry and dissolution methodology

SR-30

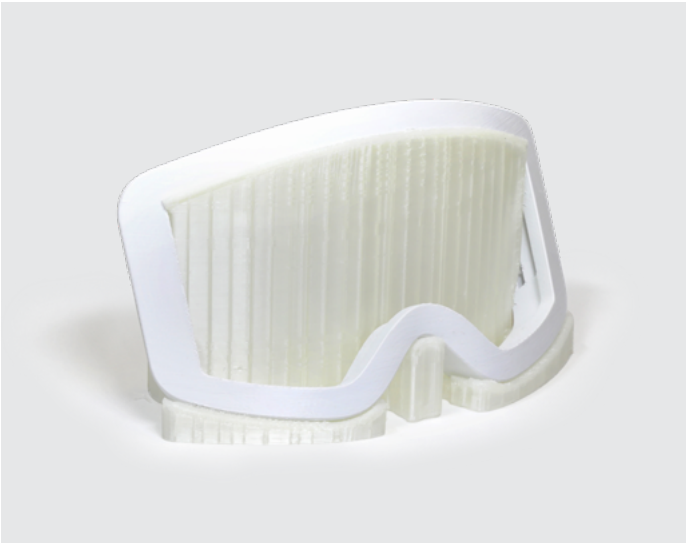
Soluble support for high temperature polymers

SR-30 is a proprietary material developed by Stratasys to work seamlessly with ABS, ASA, and various other high-temp materials. Because of this focused development, using SR-30 with these typically more challenging materials can yield exceptional results that wouldn't be possible with something like PVA, which is very difficult to use with ABS. Like PVA, SR-30 is dissolvable and can enable extreme complexity of geometry while maintaining excellent surface finish at the support site. Unlike PVA, SR-30 requires a specialty solvent along with heat, to efficiently dissolve. Users of SR-30 will need to invest in additional equipment, and possibly use in a more controlled environment like a lab.

Parts: Robotic Sander
Support: SR-30
Print Time: 17h 20m

PVA

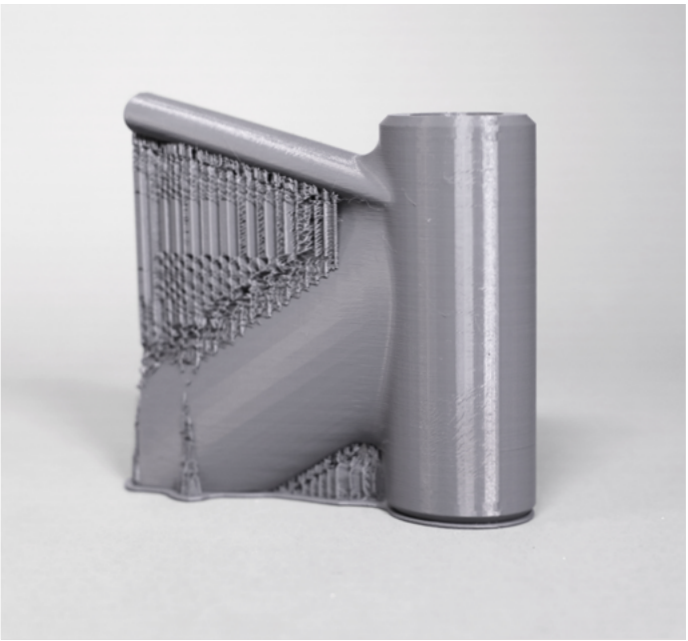
Water Soluble



PVA (polyvinyl alcohol) is a water soluble support material that is compatible with many lower temperature model materials such as PLA and PETG. Printing PVA alongside a model material requires at least two extruders so you'll need a printer with dual extrusion for this. Because PVA is water soluble, it is extremely office-friendly - you can place your part in water and after a few hours, the supports will dissolve. Using a dissolvable material like PVA allows you to create much more complex parts because the solvent (in this case water) can reach deep within channels and crevices of the part. It also can reduce the damage caused to the print, which might be more prevalent when using breakaway supports.

Parts: Ski Goggles
Support: PVA
Print Time: 14h 16m

BREAKAWAY
Using Model Material



Breakaway supports aren't so much a type of material, but rather a software trick in which the slicing program fills in the void below the model with a removable structure printed in the same material. Breakaway supports are popular because they can use the same material as the printed model with a single extruder (as opposed to dissolvable supports requiring a second extruder and material). The quality of the print then depends on a couple of variables. The first is dependent on the slicing algorithm. A good slicer will ensure that the prints are well supported, but also leave a seam along which a clean break can be made. The second thing to consider is which material is being used. A hard, rigid plastic like PLA is really best for this because it is more apt to having a clean fracture whereas a less rigid plastic will bend and tear when removing support, leaving remnants on the model part.

Parts: Bicycle Front Stem
Support: Breakaway
Print Time: 7h 12m

BREAKAWAY
Using Support Material

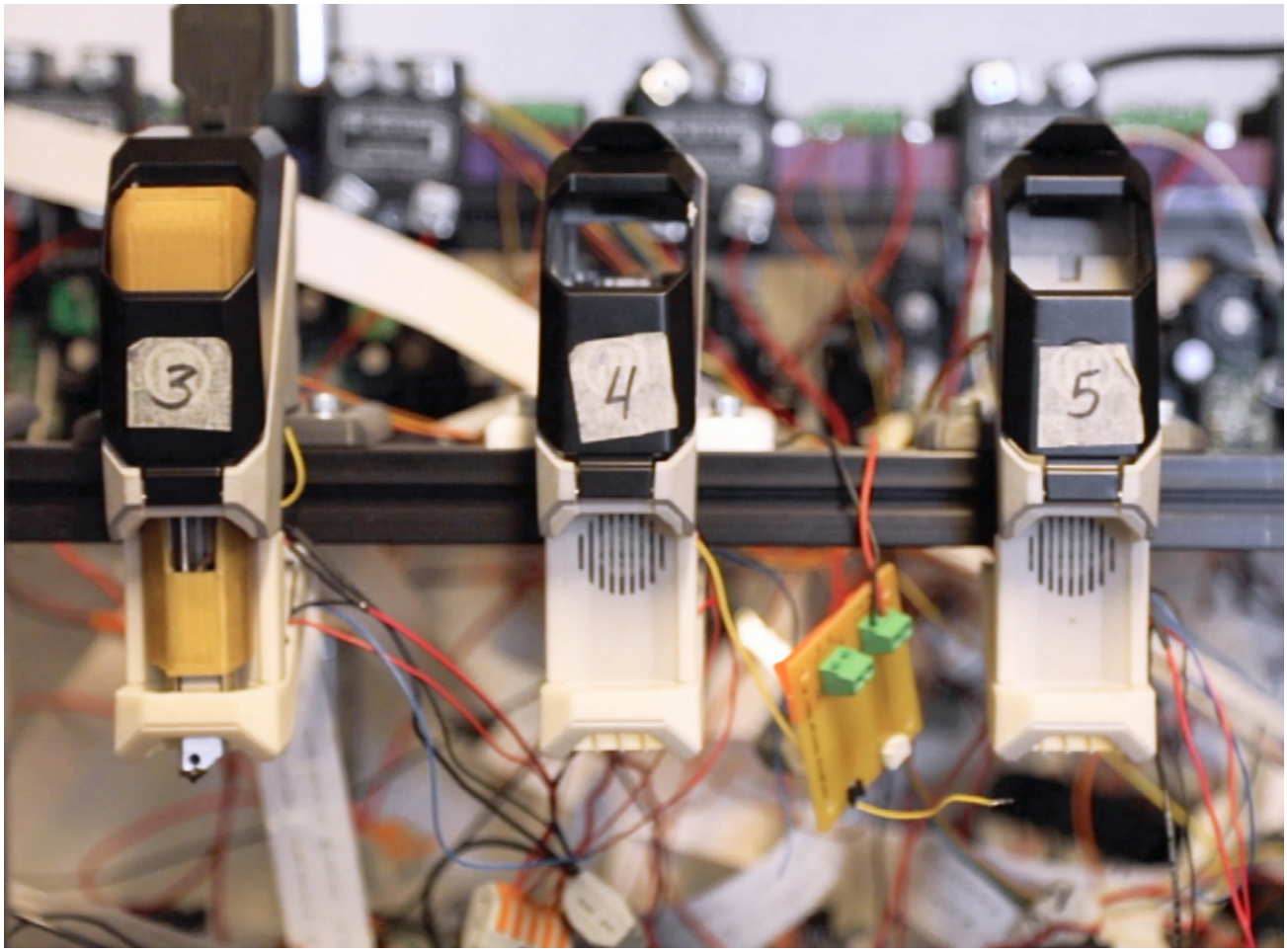
For certain model materials, using the primary material as model AND support isn't really feasible. This can be due to a variety of reasons, but most commonly you'll find issues when the material is less rigid and more pliable. ABS is one example of a material where you may have a more difficult time because removal of the ABS supports is more of a tearing action than fracturing. This can leave unwanted artifacts on your print. Thus there is an option to use a different material (either model or support) loaded in the second extruder as a breakaway material. You may find settings to do just this and it can allow the user to use a more pliable material in a situation where they want the post-processing speed offered by breakaway supports.

Parts: Bicycle Pedal
Support: SR-30 Breakaway
Print Time: 10h 34m

Not All 3D Printers are Equal: 5 Things that Allow MakerBot METHOD to Print Materials Better

While FDM (also known as FFF) is a specific category of 3D printers, that doesn't mean all FDM 3D printers are created equally. Within the family of FDM, costs can range from $200 to $200,000. While the most basic 3D printing technology is a build plate, with an extruder and a gantry, there are many things you can do to improve print quality, material diversity, complexity, and more. For this section, we're going to focus on the industrial processes and features that enable the MakerBot METHOD to print with a unique blend of speed, dimensional accuracy, and reliability. We'll go in chronological order from initial development through to final print.

1. Testing and Optimization



PRINTER OPTIMIZATION

Once the decision is made to optimize a new material for the METHOD platform, MakerBot typically works with a material supplier to get samples and suggested settings. From there, a collaborative effort between MakerBot's software development team and test engineering group will develop and optimize slicing profiles that will yield best results in part quality, surface finish, dimensional accuracy, and print time. Depending on the material type, this process can take up to several months.

TORTURE TESTING

During the optimization, ABR tests are conducted across dozens of printers to ensure consistency of these settings while printing some of the most challenging geometries. These tests can be grueling and push the printers to their limits to find the limits of both the hardware and the material, and ensure the user will have a good experience when they print with the new material.

2. Shipping and Handling

SMART SPOOL / MYLAR BAG

Once the material is manufactured, it is spooled up and bagged. METHOD utilizes the Smart Spool system, which is a purpose-built spool that contains sensors read by the printer when loaded into the material bay. The RFID chips contain information about the material type, color, amount remaining on the spool, etc. This information allows the printer to use the optimized print settings with the material type, further streamlining the user experience. The spools are shipped in resealable mylar bags, which are impermeable to light and moisture and help protect the filament from potential damage. Within the spool there is also desiccant to keep the environment moisture-free.

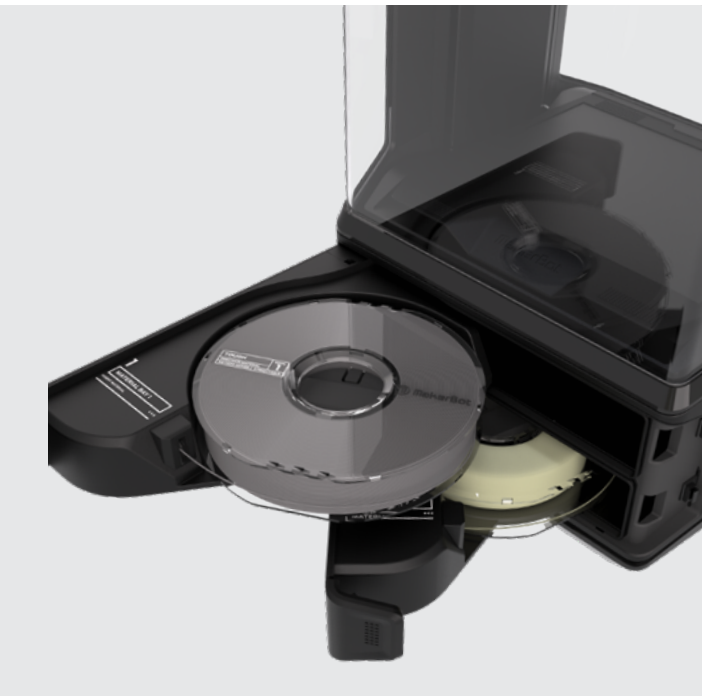
3. Loading and Storing

SMART ASSIST MATERIAL LOADER

Once the spool is loaded into the drawer of the material bay, you only need to insert the tip of the filament into the material slot. The printer recognizes the presence of filament and will do the rest of the work loading the filament up the routing tube and into the extruder. This hands-free process is not only convenient for users but also prevents the user from accidentally adjusting a calibrated extruder.

DRY-SEALED MATERIAL BAYS

Once material starts loading, the drawers on the material bays can be closed. The two Dry-Sealed Material Bays are sealed from the outside environment. This seal, combined with the desiccant cartridge of the Smart Spool, ensures that the material is stored in a low-humidity environment even during printing and in between prints. A sensor in the bay can show the humidity level within the bay and humidity levels can be tracked across Smart Spools. Protection from humidity is especially important when printing with materials like Nylon and PVA – both of which are prone to absorb moisture which can cause damage to the end print.



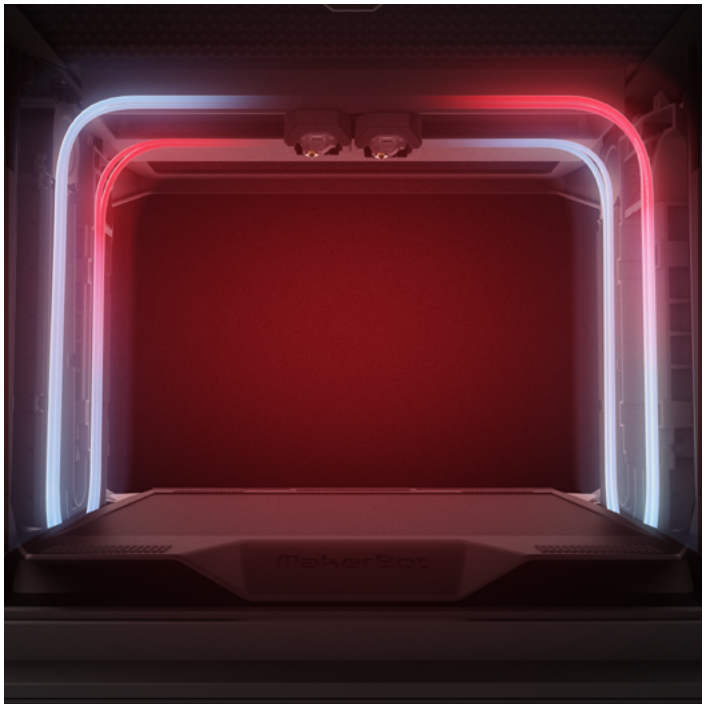
4. Printing

PERFORMANCE EXTRUDERS

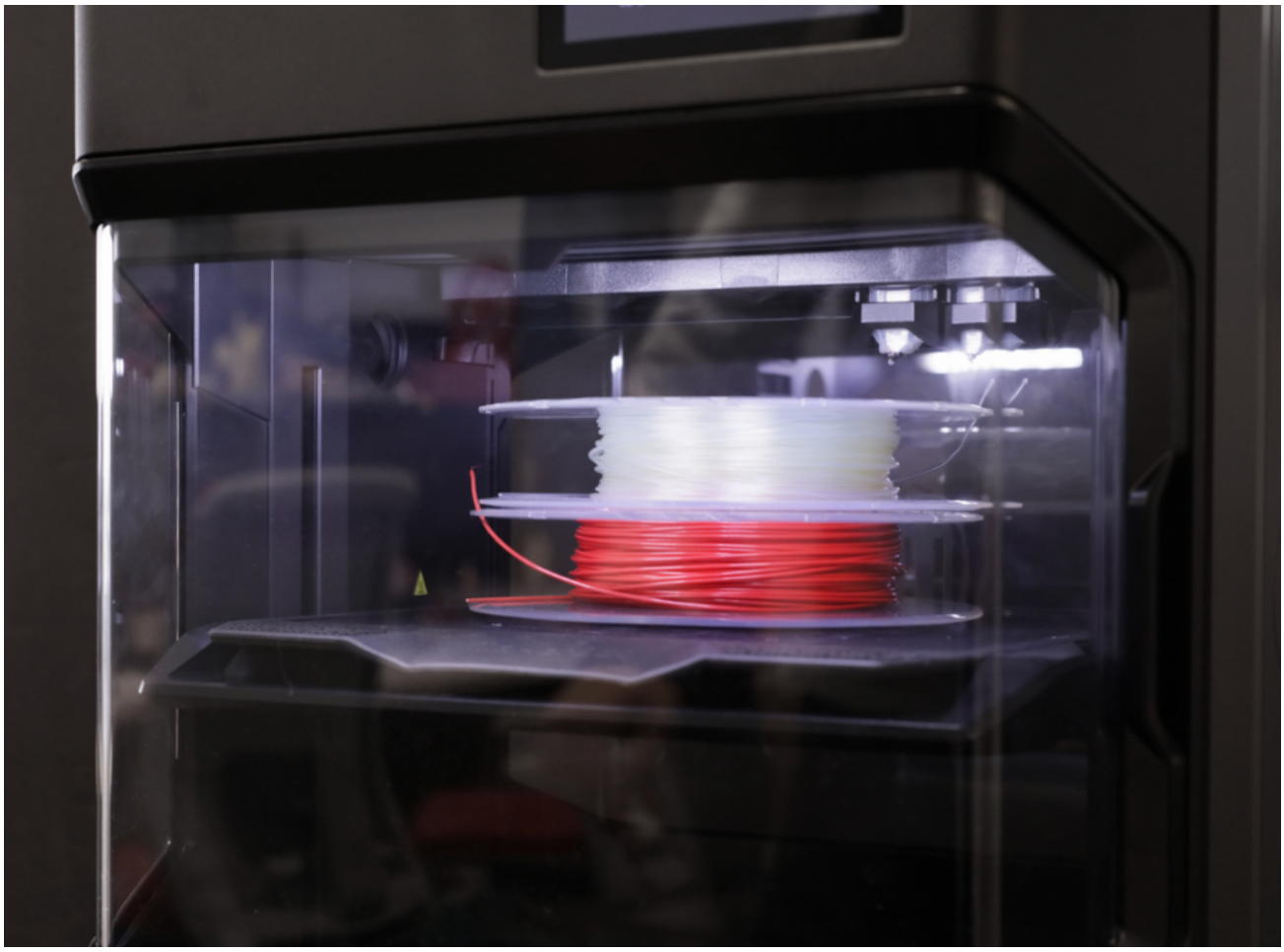
METHOD has two extruders – one for model material and one for support material. These extruders are packed with a sensor suite and chip set that enable them to accurately control print temperature so as not to damage materials. The sensor suite also includes active jam detection, and auto-stop when filament runs out. With a range of temperatures, METHOD's extruders can handle higher temp materials such as ABS and ASA, or when active cooling is turned on, single extrusion low temp materials can be printed with ease.

CIRCULATING HEATED CHAMBER

One of the marquee features of METHOD that distinguishes it from other 3D printer options in its price class is the Circulating Heated Build Chamber. Using two active heat exchangers on either side of the printer, METHOD warms the chamber temperature from 40ºC and 100ºC depending on the material. By creating a consistent chamber temperature throughout, METHOD is able to achieve a printed part dimensional accuracy within ±0.007in (±0.2mm) of the CAD design. The added heat also increases the strength of the bond between vertical layer lines – giving the part strength on all three axes (not just two).



5. Drying



CHAMBER MATERIAL DRYING

METHOD has the ability to dry spools using the heat within the Circulating Heated Chamber. This is great if you have a spool that's been left out of the bag for a long period of time, or if the spool is older and the desiccant has become saturated. To run this function, use the touchscreen to navigate to **Settings > Advanced** and select Dry Filament. To take it one step further, get the Material Dry-Kit which includes a fresh bag and fresh desiccant. Putting your spool into the kit before running the dry cycle will improve the results significantly.

Polymers

	Conceptual Prototyping	Functional Prototyping	Manufacturing Aids	End-Use Parts
PLA	☑☑☑	☑☐☐	☑☐☐	☑☐☐
TOUGH	☑☑☐	☑☑☑	☑☑☑	☑☐☐
PET-G	☑☐☐	☑☑☑	☑☑☑	☑☐☐
ABS	☑☐☐	☑☑☑	☑☑☑	☑☑☑
ABS R	☑☐☐	☑☑☑	☑☑☑	☑☑☑
ASA	☑☐☐	☑☑☑	☑☑☑	☑☑☑
NYLON	☑☐☐	☑☑☑	☑☑☑	☑☐☐
PC-ABS	☑☐☐	☑☑☐	☑☑☑	☑☑☑
PC-ABS FR	☑☐☐	☑☑☐	☑☑☑	☑☑☑
JABIL TPE SEBS 1300 95A	☑☑☐	☑☑☑	☑☐☐	☑☐☐
MITSUBISHI DURABIO	☑☑☐	☑☑☑	☑☐☐	☑☐☐
POLYMAKER POLYMAX PC	☑☐☐	☑☑☐	☑☑☐	☑☑☑
POLYMAKER PC-PBT	☑☐☐	☑☑☑	☑☑☐	☑☑☑

	Conceptual Prototyping	Functional Prototyping	Manufacturing Aids	End-Use Parts
POLYMAKER POLYMAX PC-FR	☑ ☐ ☐	☑ ☐ ☐	☑ ☑ ☑	☑ ☑ ☑
POLYMAKER POLYLITE PC	☑ ☑ ☐	☑ ☑ ☑	☑ ☐ ☐	☑ ☑ ☐

Composites

Nylon (6/66) Carbon Fiber	☑ ☐ ☐	☑ ☑ ☐	☑ ☑ ☑	☑ ☑ ☐
Nylon 12 Carbon Fiber	☑ ☑ ☐	☑ ☑ ☐	☑ ☑ ☑	☑ ☑ ☑
KIMYA PETG CARBON FIBER	☑ ☐ ☐	☑ ☑ ☐	☑ ☑ ☐	☑ ☑ ☐
KIMYA ABS CARBON FIBER	☑ ☐ ☐	☑ ☑ ☐	☑ ☑ ☑	☑ ☑ ☐
JABIL PETG ESD	☑ ☐ ☐	☑ ☑ ☑	☑ ☑ ☑	☑ ☐ ☐
KIMYA ABS KEVLAR	☑ ☐ ☐	☑ ☑ ☐	☑ ☑ ☑	☑ ☑ ☐
KIMYA ABS EC	☑ ☐ ☐	☑ ☑ ☑	☑ ☑ ☐	☑ ☑ ☐
KIMYA ABS ESD-S	☑ ☐ ☐	☑ ☑ ☑	☑ ☑ ☑	☑ ☑ ☐

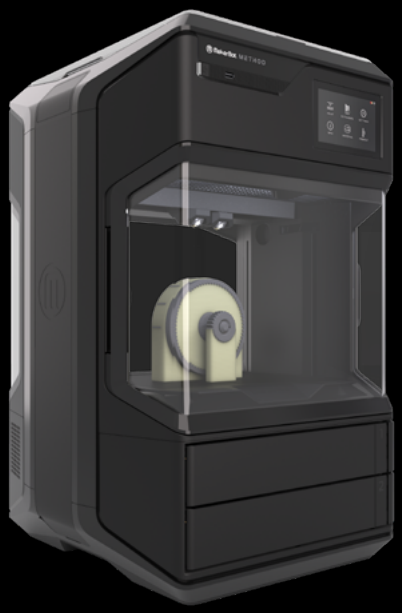
Metals

BASF Ultrafuse 316L Stainless Steel	☑ ☐ ☐	☑ ☑ ☑	☑ ☑ ☐	☑ ☑ ☑

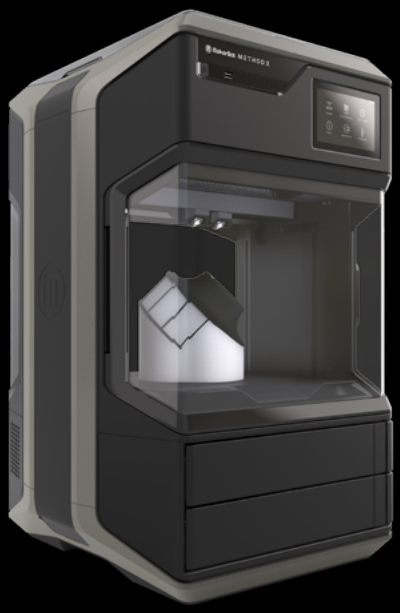
MakerBot

METHOD

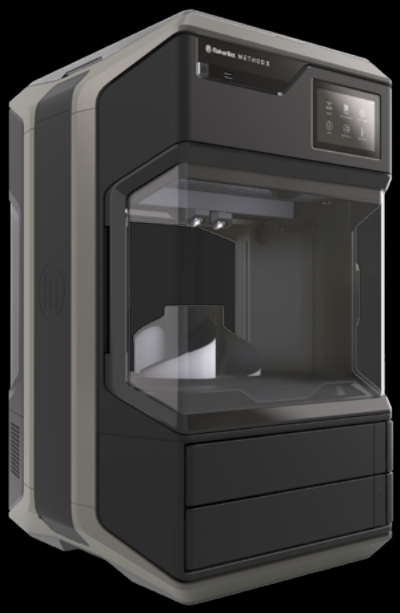
Limitless 3D Printing



METHOD



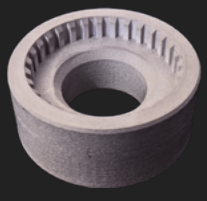
METHOD X



METHOD X
CARBON FIBER EDITION

POLYMERS

COMPOSITES



METAL

Print all the materials in this guide and more on METHOD

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