It’s so nice to see you again

Medical Applications with KODAK 3D Printing

Additive Manufacturing or 3D Printing

AM is now used in the development of new surgical cutting and drill guides, prosthetics, as well as the creation of patient-specific replicas of bones, for studies cases.

Advantages of 3D Printing

- **Customization**
  The individualized nature of health care means that AM is an ideal solution for the medical industry. Rather than manufacturing thousands of identical components, AM enables the creation of prosthetic and orthotic devices tailored to a patient's specific anatomy improving their effectiveness.

- **Complexity**
  Where in the past, traditional manufacturing may have struggled to create complex, organic shapes, the designs that AM technologies are now able to print are potentially limitless. Thin scaffolds that perfectly follow the contour of a bone, open the door to many applications and designs that were not previously possible.

Advantages of 3D Printing

- **Lead Time**
  Lead times to create tooling in-house, provide designers and engineers the tools to quickly create and iterate designs and to communicate more effectively using realistic prototypes within a matter of hours. It is now possible to iterate the design of a medical tool, based on direct feedback from the surgeon, who will use it to print a new prototype for evaluation, while the final design is still being optimized.

- **Cost**
  As well as the ability to create custom, complex components, AM is best suited for low volume production, meaning that cost often drops while effectiveness increases. AM technologies also produce parts using only the material they need, reducing waste and further reducing costs.

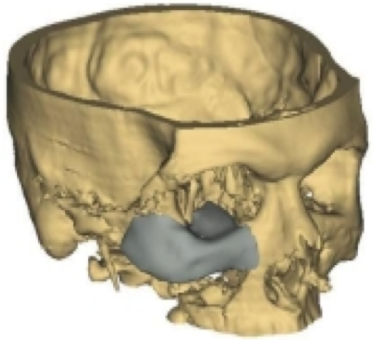
Sterilizability

AM Materials

Material	Technology	Acceptable sterilization method
ABS	FFF	Gamma irradiation, ethylene oxide
PC-ISO	FFF	Gamma irradiation, ethylene oxide
PLACu	FFF	Gamma irradiation, ethylene oxide
PLAAg	FFF	Gamma irradiation, ethylene oxide
PLA+ (FDA)	FFF	Gamma irradiation, ethylene oxide
PETG	FFF	Gamma irradiation, ethylene oxide
PA12 (nylon) (FDA)	FFF	Gamma irradiation, ethylene oxide

Data Generation (CT, MRI, 3D scan)

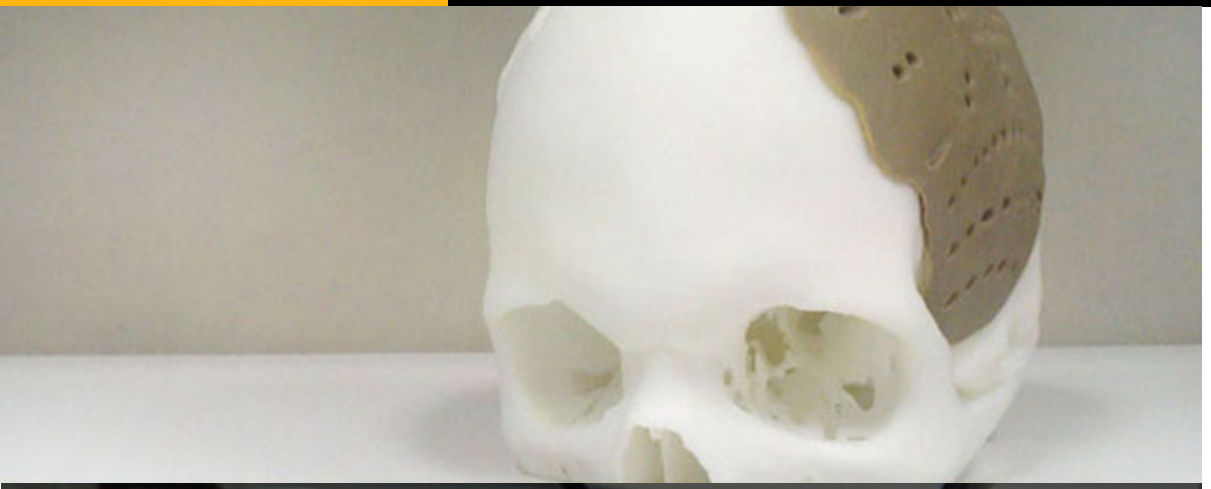
The ability to produce patient-specific parts directly from scan data is an obvious benefit with 3D printing, and one that is not cost-effective with most conventional manufacturing techniques. These tailored parts are made possible through software that converts the patient's own scans (using techniques like computerized tomography (CT), magnetic resonance imaging (MRI), and laser scanning, into 3D files that will converted into a printable file by the 3D printing engineers.



Improve Productivity with KODAK 3D Printing

Common Applications

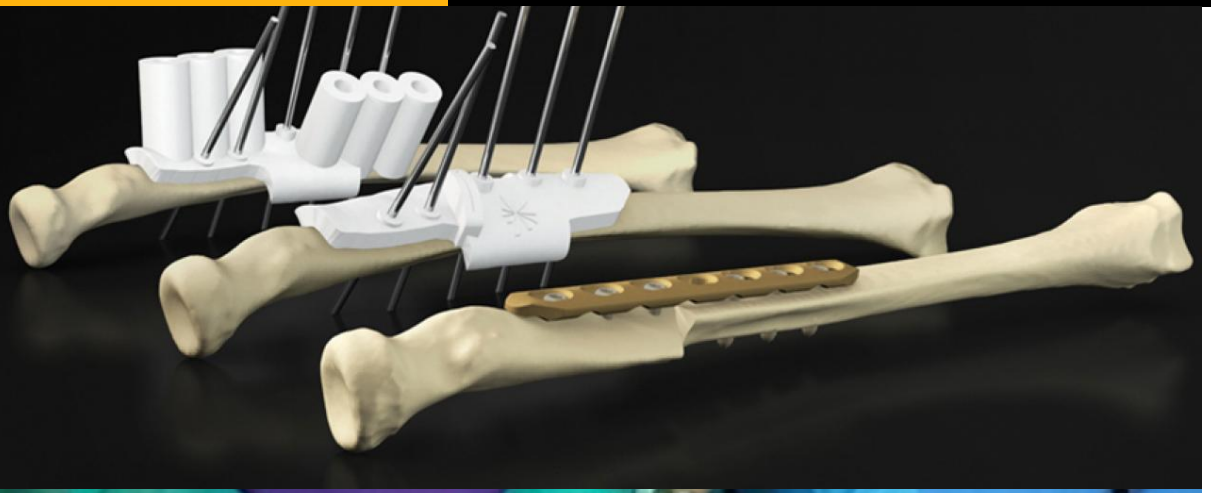
Surgical Learning Tools



Physicians are now using models produced by AM from patient scan data to improve the diagnosis of illnesses, elucidate treatment decisions, plan, and practice selected surgical interventions in advance of the actual treatments. The models help physicians understand patient's anatomy that is difficult to visualize, especially when using minimally invasive techniques. Models also assist in accurately sizing medical devices. Physicians can also use the models to explain an upcoming surgery to patients and their families and to communicate the surgical steps to the clinical team.

Common Applications

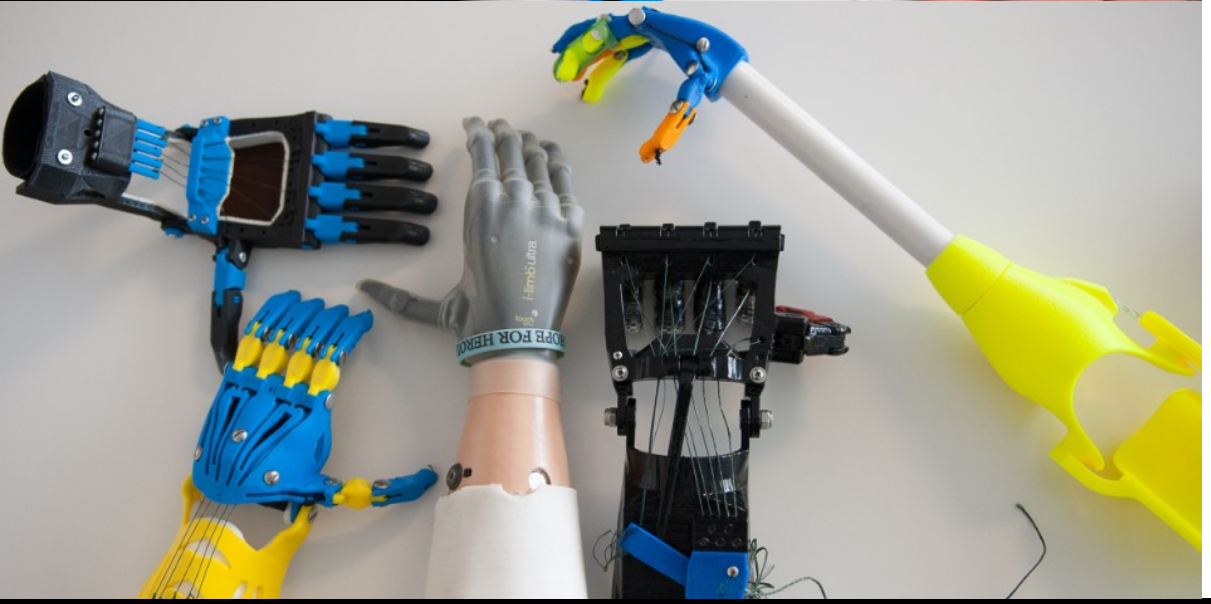
Surgical Guides and Tools



Physicians implement guides and tools to assist in surgery. Historically, surgical guides and tools were generic devices made of titanium or aluminum. By implementing AM, physicians are able to create guides that precisely follow a patient's unique anatomy, accurately locating drills or other instruments used during surgery. AM guides and tools are used to make the placement of restorative treatments (screws, plates, and implants), more precise, resulting in better postoperative results. Anatomical models (bone models) and surgical guides are used collaboratively, to plan and test the best locations for stabilizing screws or plates that conform to the patient’s bone surface, before performing surgery.

Common Applications

Prosthetics



Because prosthetics are such personal items, each one has to be custom-made or fit to the needs of the wearer. AM technology is now regularly being used to produce patient-specific components of prosthetics that match perfectly with the user's anatomy. The ability to produce complex geometries from a range of materials has resulted in AM being adapted at the locations where prosthetics are in contact with a patient.

Enhancing Service Level with KODAK 3D Printing Solutions

KODAK Portrait 3D Printer

The new standard in professional desktop 3D printing

A professional 3D printer platform

Experience free access to the KODAK 3D Cloud, an IT-compliant printer management software powered by 3DPrinterOS.

Up to 4-year warranty and world-class support

Our extendable 1-year warranty with annual service check-ups is backed by our +130 years experience in customer satisfaction. Quick response, professional support and well-trained local service partners.

Reliability in engineering materials (ABS, Nylon)

Only a fully enclosed environment with all-steel components and a lifting dual-extrusion system can ensure a good performance for any technical application; in ABS or Nylon just as like PLA.

Built for productivity

The KODAK Portrait 3D Printer is a reliable manufacturing system, capable of producing end-use parts in a wide variety of materials. Its solid steel structure, quality components and careful design result in a high uptime with low maintenance costs

KODAK Portrait 3D Printer

An excellent solution for enhancing productivity

Why is it so important to have a closed chamber?

- When printing **engineering materials** such as ABS, PA (polyamide, nylon), PC (polycarbonate) and others, **temperature really matters**. These filaments have a high glass transition point. To be able to print these materials shrink and warp-free, it is essential to keep your printing environment warm and stable.

- In addition, the ability to prevent the vapors generated during printing from spreading, is a fundamental **safety** feature for such thermoplastics. For this purpose, the **KODAK Portrait 3D Printer** has a built-in **HEPA filter with activated carbon**, making it one of the **most safe and reliable** desktop 3D printers on the market.

KODAK 3D Printing Filaments

Top-quality filaments for professional 3D printing

KODAK 3D Printing

Materials – KODAK 3D Printing Filament

ABS

Benefits:
- High impact resistance, slightly flexible.
- UV, heat and abrasion resistance.
- Ideal for post-processing for a shiny, smooth surface (advanced users).

Main application:
- Functional prototypes.

HIPS

Benefits:
- A filament with some of the best characteristics of PLA an ABS.
- Great interlayer adhesion.
- Resistance to shattering, low warp.

Main application:
- High impact resistant and silky surface.
- Rigid limonene-soluble support material.

PETG

Benefits:
- Easy to print.
- Strong and temperature resistant.
- Food-safe.

Main application:
- Practical applications including food packaging.

Flex 98

Benefits:
- Semi-flexible.
- Make strong, shatter-resistant objects.
- High abrasive resistance.

Main application:
- Semi-rigid with excellent impact and abrasion resistance.

PLA+

Benefits:
- Easy to print.
- Very low shrinkage.
- Wide range of colors.

Main application:
- Concept modeling.

PLA Tough

Benefits:
- Ideal ABS substitute for many tasks.
- High strengh.
- Very low shrinkage.

Main application:
- Prototypes and functional parts not used at high temperature.

KODAK 3D Printing

Materials – KODAK 3D Printing Filament

Nylon 6

Benefits:

- Very strong, shatterproof functional objects.
- High abrasive resistance, small friction coefficient (slippery)

Main application:

- Maximum strength, production-ready functional prints.

Nylon 12

Benefits:

- Extremely tough with superior tensile, elongation at break and impact strength, high fatigue endurance and low friction coefficient.
- Very low warping and moisture absortion before and after printing.
- Superior chemical, UV and heat resistance (over 120°C).

Main application:

- High fatigue, snap fits, functionally strong parts with high resistance to environmental stress.

PVA

Benefits:

- Allows you to create support structures for complex prints.
- Dissolvable in water.
- Biodegradable and non-toxic.

Main application:

- Support material.

Acrylic

Benefits:

- A semi-transparent material, ideal for pieces with movable parts.
- Exceptional ability to print bridges.
- Very hard and not very flexible, ideal for those pieces that require a lot of rigidity.
- Very low coefficient of friction.

Main application:

- Suitable for optical polycarbonate applications.

Nylon 6/66/12

Benefits:

- Strong as nylon, but with greater flexibility.
- Low warping, allowing for better printing of fine details and overhangs.
- With possibility to use a layer fan for even finer details or printing long bridges.
- Good adhesion to the printing surface.

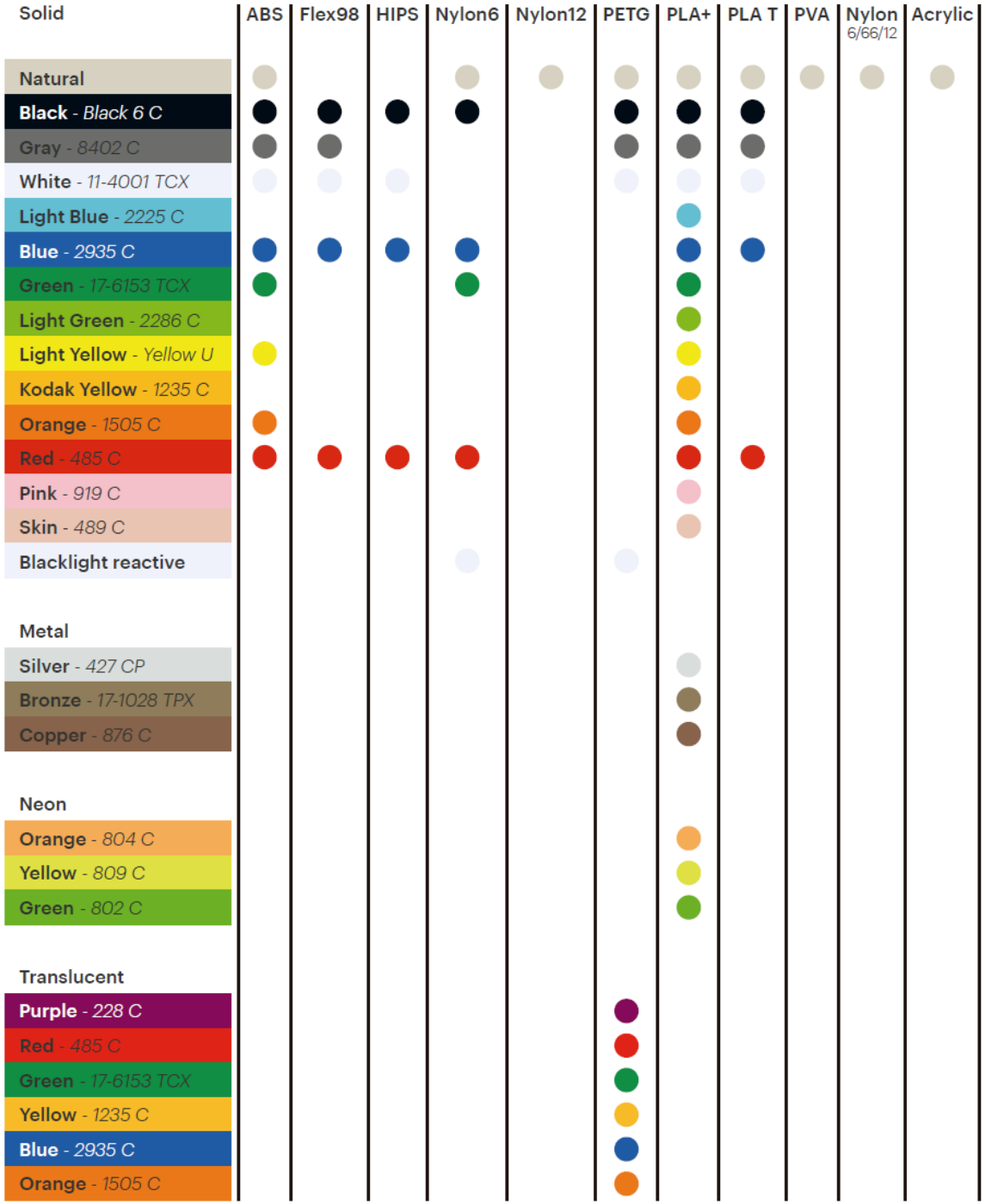
Main application:

- Parts that need to be very strong with tensile resistance, or strong parts with fine details.

Materials

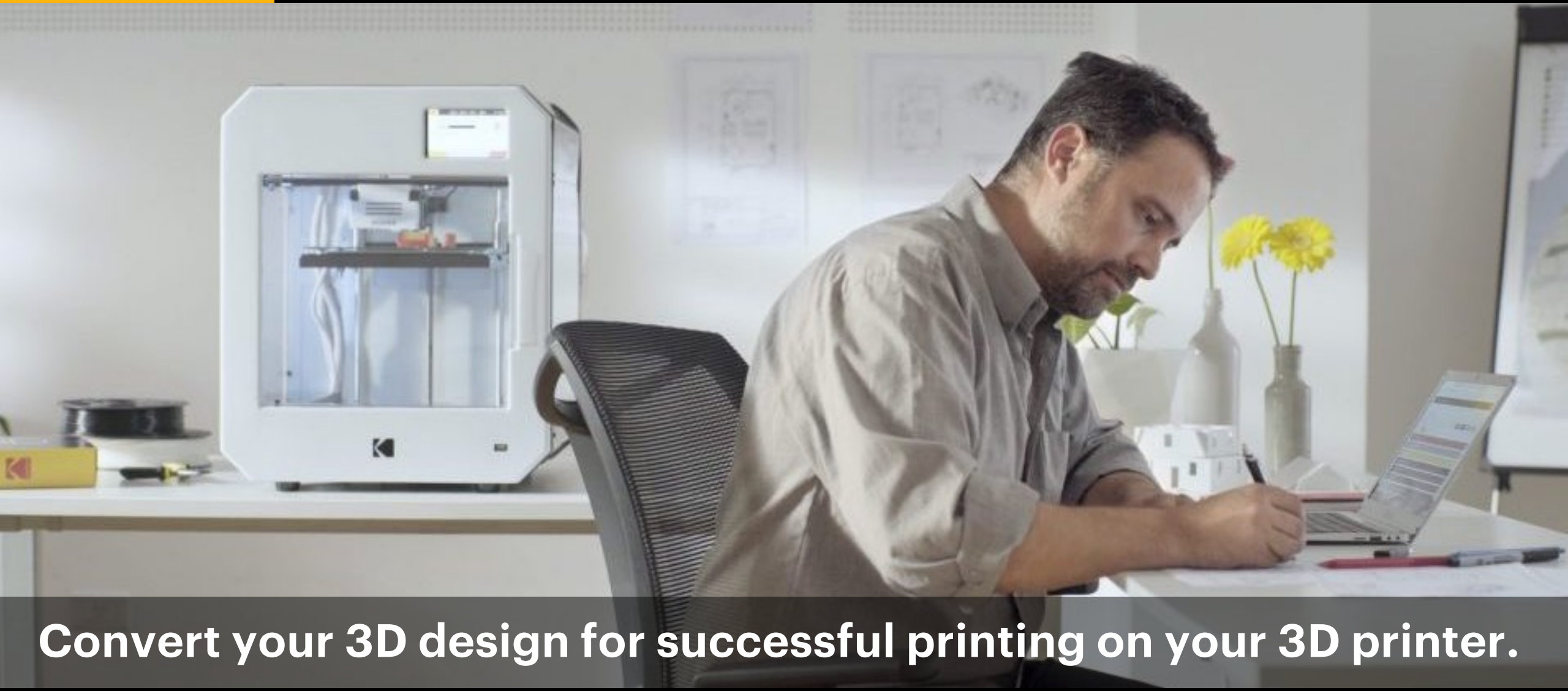
KODAK 3D Filament

Color Chart



KODAK Design to Print Service

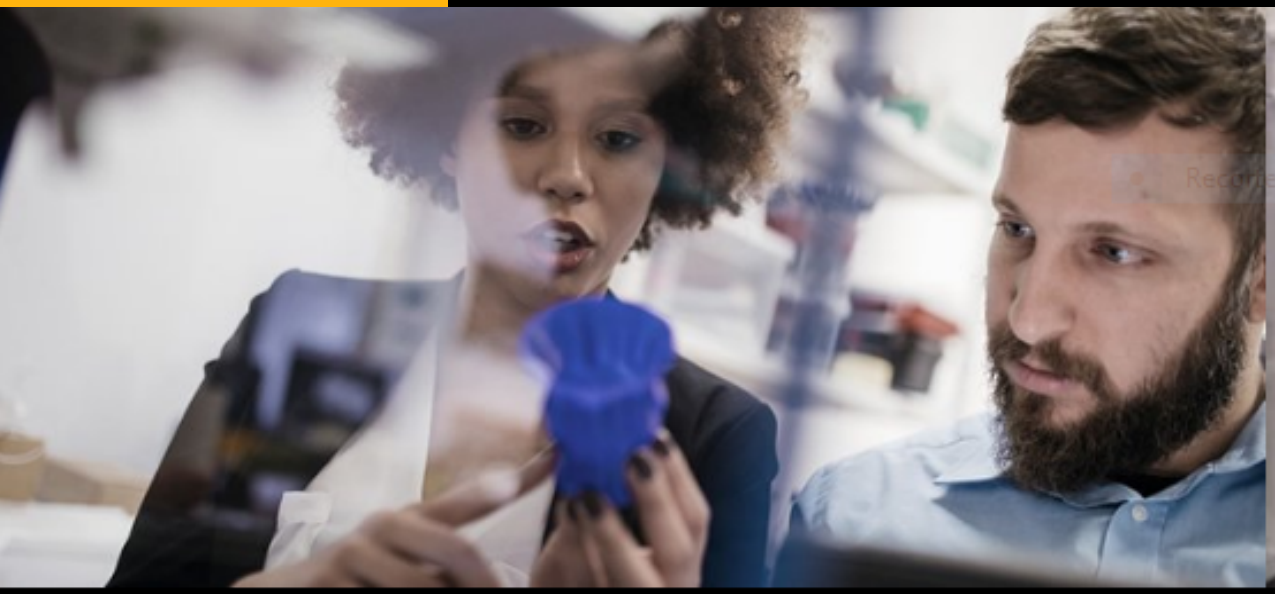
Save valuable time and maximize print quality



Convert your 3D design for successful printing on your 3D printer.

KODAK Design to Print Service

Save valuable time and maximize print quality



3D DESIGNER SERVICE

Modify your 3D design for successful printing on your 3D printer. You will receive an STL file optimized for additive manufacturing.

PRINT PROFILE CUSTOMIZATION

Create an optimal print file for your KODAK 3D Printer from an STL file. The objective is to reduce print time, maximize print quality, adjust print tolerances, and set the gcode parameters depending on the materials you will print with.

Convert your 3D design for successful printing on your 3D printer.

KODAK Portrait Ecosystem

Comprehensive Solution

What's included?

- 1 KODAK Portrait 3D Printer
- 1 Smart3D Printer Cabinet
- Design to Print Services
- KODAK Filaments
- Installation, training and support

Thank You