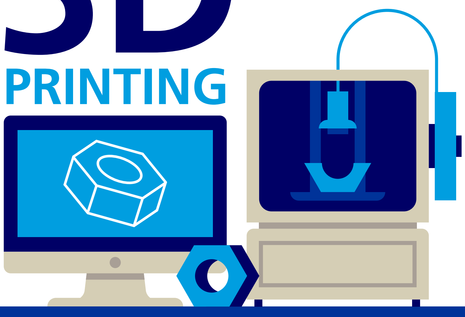
3D PRINTING

ZURICH®



THE NEXT INDUSTRIAL REVOLUTION

3D printing is revolutionizing the way we do business — impacting the production process, workforce and supply chains.

Anticipate and mitigate the risks before implementing 3D printing into your production process.

HOW IT WORKS

1. Computer Aided Design (CAD) system software creates a 3D design of product
2. Final design is converted to an electronic format readable by the 3D printer
3. Materials that will become the 3D object are manually or automatically loaded into the 3D printer
4. Printer receives electronic file of the object
5. Object is automatically dispensed or removed by hand
6. Product is refined into precise shape
7. 3D-printed object may be further refined using traditional secondary operations

TIMELINE OF 3D PRINTING

1984
3D printing is invented by Charles "Chuck" Hall

1992
First 3D printer is built

1999
First 3D organ is created

2006
Selective Laser Sintering allows mass customization in manufacturing

2009
DIY kits for 3D printers enter the marketplace

2011
14K gold and sterling silver used as printable materials

First 3D printed robotic aircraft

First 3D printed car

2012
Lawsuit over patent infringement

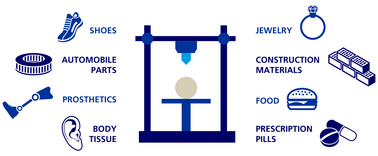
2013
A printer capable of using multiple materials is released

2014
First carbon fiber 3D printer is available

First exoskeleton robotic suit is 3D printed

2015
FDA first approval of a 3D printed prescription pill

OBJECTS CURRENTLY BEING 3D PRINTED FOR ACTUAL USE



USING 3D PRINTING AS A PROTOTYPING TOOL HAS ITS ADVANTAGES

INNOVATE FASTER

REALIZE DESIGN ERRORS SOONER

CUSTOMIZE PRODUCTS FOR THE MASSES

ASSESS THE RISKS

PRODUCT LIABILITY RISK
Who actually owns the product that you are printing? Is it the owner of the printer, the owner of the template or the owner of the material?

SUPPLY CHAIN RISK
Have you conducted the appropriate due diligence for your business interruption — does your supply chain risk increase or decrease? Do you have other suppliers for the materials you are printing from?

OPERATIONS RISK
Do you have trained employees to run the 3D printers? Do you have the proper power supply requirements? Is there a business interruption plan should the printer breakdown or the supplies aren't delivered?

ENVIRONMENTAL RISK
Have you thought about the exhaust issues the 3D printer emits? Have you thought about the housing issues, or the heat it generates? How will you dispose of the waste materials?

CYBER SECURITY RISK
Have you thought about the implications of having your software stolen? What if someone counterfeits inferior goods? How will you protect your designs and formulas?

TECHNOLOGY RISK
Do you own the software to the product that you are printing? Do you own the design template?

CONTRACTUAL RISK
With so many companies involved in the process (producer of printer materials, manufacturer, retailer, etc.), do you have adequate contractual risk transfer controls in place?

PEOPLE RISK
Are employees being properly trained in handling of new equipment and materials, especially if toxic?

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