

CHINA 華牌 BRAND[®]

3D PRINTING AND INTELLECTUAL PROPERTY

How Companies Can Protect Themselves

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CHINABRAND CONSULTING LTD.

Grashofstrasse 3 ▪ 80995 Munich ▪ +49 89 32 12 12 80

info@chinabrand.de ▪ www.chinabrand.de

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Grashofstrasse 3

80995 Munich

+49 89 32 12 12 80

www.chinabrand.de

Contents

Executive Summary.....	4
The Impact of 3D Printing on China.....	5
Risks for Businesses	7
Prevention of Counterfeiting	10
Using 3D Printing – Avoiding Legal Violations.....	12
Conclusion: Efficient Protection is Feasible.....	15
Further Information and Contact.....	16

Executive Summary

3D printing has the potential to become a huge benefit for innovative companies. However, besides the advantages of reduced operating and development costs, higher flexibility, and faster production, this new technology comes along with certain risks. Those who intend to legally use the 3D printing technology must carefully consider existing patents as well as further IP rights in the field of 3D printing. Moreover, companies are advised to effectively protect their own 3D printing programs- and data against theft and counterfeiting.

3D printing is not only for companies a great step forward but offers new opportunities for counterfeits as well. Never has it been easier to copy and reproduce products – even those protected by patents, trademark rights or copyrights. Damages can be tremendous since every printed copy of an invention means the loss of potential customers for the actual owner of the patent rights. The distribution of illegally uploaded CAD¹ data for 3D printing on the internet is an additional challenge.

The era of 3D printing calls for new measures to detect forgers, prove counterfeiting and enforce one's IP rights. This white paper aims to display the range of IP protection and what entrepreneurs need to bear in mind.

¹ CAD: Computer Aided Design

The Impact of 3D Printing on China

3D printing plays an important role in China. It supports the country to implement two of its basic strategies: industrial production for the domestic and global market as well as the modernization of manufacturing technology in the wake of the state development plan “Made in China 2025”.

Chinese Companies Benefit from 3D Printing

Besides being inexpensive, 3D printing gives Chinese companies the opportunity to replace mass production with mass customization, meaning the large-scale production of customized products. So far, China could profit from its cost advantages mainly in the mass segment, but innovative production technology now makes smaller batch sizes feasible, too. The worldwide search for new sales markets, the global demand for customized products and the digitalization of distribution channels are the main drivers of this concept. Chinese companies compete with their Western counterparts when it comes to the use and development of 3D printing.

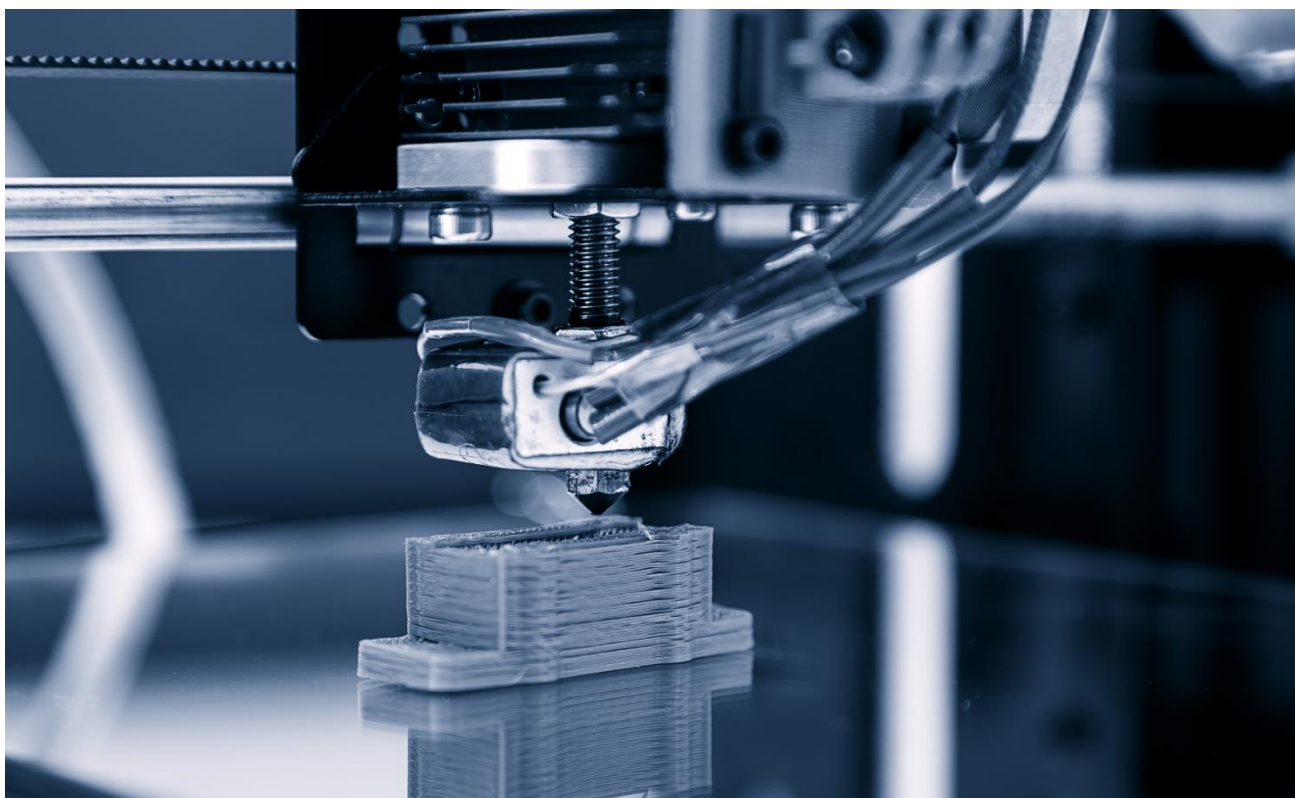
The Risks of the Patent Tsunami and State Interference

Chinese patent applications, too, highlight the importance of 3D printing. In China, the number of patent applications in the field of additive process has increased within the last five years to several thousand a year. Initially, the majority of such patent applications were filed by universities, hospitals, research institutes and a wide range of individual inventors. Now, the *Asian Manufacturing Association (AMA)*, backed by the Chinese Government, aims to pool and coordinate the innovative power in this area through its 3D printing sub-organizations.

The influence of the state as well as the focus on developing equivalent technology has led to an increased threat to Western companies. Chances are that Chinese patents will jeopardize their *freedom to operate* or that Western companies themselves will infringe upon Chinese patents and be held accountable. The vast amount of Chinese patent applications has the power to block foreign manufacturers from entering the growing market for 3D printing and to turn it into a high-risk area of business.

How Counterfeiters Benefit from 3D Printing

Western companies face new challenges: Besides the increase of Chinese competition and blocking patents, 3D printed counterfeits have become a growing problem. The number of cases in which Chinese forgers copy original spare parts and components by using 3D printing technology is growing at a fast pace. This new technology has not only helped counterfeiters to copy car and aircraft components but furthermore surgical instruments, components for hearing aids and pacemakers, medical prostheses and implants as well as dentures. Material deficits and quality issues increase the risk for users. The damage of the original manufacturer’s reputation will be inevitable.



3D Printer. Photo: Shutterstock

Copying original products has never been easier thanks to 3D printing.

3D print templates are available online; high-quality 3D printers are commercially available at low costs. The use of 3D printers often results in the violation of the IP rights of the original manufactures (copyrights, trademarks, patents and design rights) or other third parties. Besides, the rules of competition law are violated, too.

Risks for Businesses

The 3D printing process requires a CAD file in which the object to be printed is formatted using 3D printing software or a 3D scanner. The file is transmitted to the 3D printer, which then transforms the digital model additively, i.e. the application of material layers, into a physical object.

A growing variety of materials can be processed this way. This makes 3D printing not only interesting for companies in the fields of technology, but also for manufacturers of medical devices, companies in the fashion or the agricultural and food industry. Since companies from a wide range of industries drive innovation and business development in 3D printing, the patent situation has become quite confusing and requires extra caution.

Legal challenges that businesses in the field of 3D printing need to consider are:

- Risks of violating the IP rights of third parties
- Protecting the own products against 3D printed counterfeits



3D printing example: Layer's wheelchair

Risks of 3D Printing

Third party rights may exist both on the artwork and on the original product. These results, amongst others, in the following legally relevant questions:

- Is the template protected by copyright or other means?
- Can an unprotected original be used for serial production without violating the Unfair Competition Law?
- Is offering a protected template on the Internet a violation of law? If so, is the unintentional use of the illegally uploaded template punishable?
- Can the original product be scanned to create the template of a new electronic design plan?

- Although many questions remain unanswered, entrepreneurs can be sure of one thing: If an original product or a construction plan is protected by intellectual property rights, the offering of its template and the commercial printing of the product without the consent of the copyright holder are illegal.

Printing templates from online platforms should be treated with caution. Whether the copyright owner has given his/her consent to use these print templates is not always obvious.

If a competitor wants to print a company's original products or offer their templates, infringement can only be avoided through:

- Detailed examination of the legal situation, i.e. clarification whether rights of third parties are violated
- Obtaining the approval of this third party, possibly against the payment of a license fee

In order to prevent patent infringement, companies should first of all conduct a patent research. In fact, the risk of patent infringement by 3D printing is rather limited at the present time, since the current generation of 3D printers is not capable yet of printing complex technological products; in the future, however, this topic will be of higher relevance.

Another challenge regarding the commercial use of 3D printing technology is the protection of CAD files. Once CAD files of products are available online, whether stolen or through copying/scanning the product, it is difficult to stop the illegal use. If a third party uses illegally uploaded CAD files and prints the product for commercial use, it is guilty of an offense. Such violations, however, go usually unnoticed and are difficult to track down as long as the counterfeits are not sold commercially on a larger scale. Copyright does not provide enough protection for CAD files.

The main problem with 3D printing copyrights is the possibility to produce personal copyrighted objects, disregarding established markets and hard to discover, prevent or control.

The Risks of Template Distribution on the Internet

The IP laws of most countries do not prohibit the production of imitations for private use. However, 3D printing extends the possibilities of imitation by individuals to such an extent that permission to reproduce protected products for private use becomes a problem. Commercial property rights cannot be enforced in the private sector; hence, the manufacturer cannot take legal action against a private individual who uses 3D printing. Which other leverage points exist? A proceeding against the providers of the templates on the internet is the most promising way – even if this only possible on the roundabout way. If originals are distributed commercially, infringement can be prosecuted. However, this lever only works if industrial property rights for the original product exist.

There are 3D scanners already on the market that allow private individuals to create print templates even at home. This poses a huge challenge to the intellectual property law. Only with a timely interpretation of the existing laws and perhaps new regulations, the rights of the original providers can be protected. Therefore, this topic is at the top of the political agenda of industry and industry associations.

Because copyright law is often ineffective, companies need to find new ways to protect CAD files and their product in the age of 3D printing.

Counterfeits and Their Risks for Companies

Besides the risk of infringing upon the rights of third parties, companies must adequately address the threats posed by counterfeiting. If counterfeits enter the market, they can cause considerable damage to the company. In addition to lost revenues, counterfeit products are most likely to be of inferior quality, harm the reputation of the company or even jeopardize the consumer. There is therefore a broad interest in preventing, fighting and eliminating counterfeiting.

Since detecting the producers of 3D counterfeits is very difficult, it is important to effectively protect CAD files that enable the 3D printing of relevant parts and prevent them from being distributed on the Internet.

Prevention of Counterfeiting

When it comes to 3D printing, companies can only combat counterfeiting through intensive know-how protection and the registration of industrial property rights. The ultimate goal must be to maintain control of the market and prevent the appearance and distribution of copies. This is the only way for original manufacturers to leverage their innovation advantage and make use of their investments in research and development.

With 3D printing technology, products can only be copied if the forger has the digital CAD file at his disposal. The focus is therefore on the protection of know-how, which can be optimized through a bundle of security measures. Especially the combination of different protective measures increases the hurdles for counterfeiters significantly.

3D printed products are subject to intellectual property. Patents, utility models, registered designs, copyrights, and trademarks are just as valid as traditional products. The intellectual property rights of an original manufacturer can be violated if a CAD file is created, offered and distributed, or the product is actually manufactured, for example through unauthorized scanning. Such cases of violations are prosecuted by the same means as in classic counterfeiting and piracy. These include:

- Undercover investigations
- Preservation of evidences
- Trial with compensation claims and
- Deterrence through Public Relations

In the fight against counterfeiting, the materials used in 3D printing play an important role. Because the features of the end products are the results of the materials, counterfeiters require in-depth knowledge of the composition. For this reason, it is important to protect the materials in China by patents.

Western companies will upgrade in 3D printing on a legal basis and lead more processes. This is facilitated by the fact that the conditions for successful copyright and design infringement processes in China have improved significantly. In addition, there is the opportunity to take action against counterfeiters regarding unfair competition. And last but not least, original manufacturers can indirectly fight a forger if they lack the necessary licenses or certificates. The products manufactured with 3D printers are subject to the same safety and labeling regulations as conventional products.

Measures to Restrict Unauthorized Usage

In order to curb the unauthorized use of works that are protected by copyright, right-holders can make use of technical measures. These allow, for instance, the marking of the object and the associated 3D print file with a unique identifier. This is how the right holder can monitor the usage. Bypassing these technical precautions is explicitly prohibited by the WIPO Copyright Treaty (Article 11).

Close cooperation between the right holders and the manufacturers of 3D printers suitable for production might make sense. Cooperating with the platforms that make 3D files public can also help curb unauthorized use.

Once these measures have been taken, the right holder has the opportunity to create a legal offer of downloadable 3D printed files or printed objects. As 3D printing services are now easily accessible, future fee-based online and subscription 3D print file models could be created, similar to existing music or film offerings. Some of these models are already available, for example on the cloud-based platform of the 3D printing software Autodesk.

Apart from the already mentioned IP law challenges, 3D technology raises further legal questions on quality assurance, liability and public policy. All these aspects need to be clarified by law in the near future.

Using 3D Printing – Avoiding Legal Violations

Companies using 3D printing are likely to violate the IP rights of others. How can they avoid this?

Defensive Strategies

Only those who analyze the patents of their competitors can avoid violations. Such analysis can be conducted by companies themselves using databases - alternatively, they hire an experienced partner who not only searches for relevant patent documents but also has the technological expertise to analyze the risk of IP infringement by certain products. Such an expert can also advise companies on alternative strategies. This may include, for example, taking the license, sourcing from authorized sources or even deleting the interfering patent. In order to identify all relevant patents, continuous monitoring of news and research on litigation are crucial.

Patent rights can also be infringed by components and raw materials that the company procures externally. The resulting risks can be minimized by demanding a compensation guarantee from the supplier in the event of a possible IP infringement. However, this remedy can only work if the supplier has the financial ability to meet the commitment.

Designs, too, can be violated by 3D printing. To prevent such violations, the company must ensure that its product does not include too many design elements of a competitor's proprietary design.

Comprehensive trademark research is crucial for avoiding problems and confusion with similar brands – the expertise of IP specialists can be of great value here, as well.

It is comparatively easy to avoid problems with business secrets and copyrights. Those who do not actively violate the rights of others, for example by copying products, are on the safe side.

Offensive Strategies

Companies that use 3D technologies in China should also efficiently protect their own innovations and products through patents, trademarks, trade secrets, and copyrights. Here, an offensive IP strategy is necessary.

1. **Design:** A company may apply for a design to protect the shape or surface texture of the printed object. Even the 3D printer itself can be protected to claim the holistic object or innovative parts of it. Applying for a design is less expensive and time consuming than for a patent. In addition, it is easier to prove forgery of a design than of an invention patent.
2. **Utility Model:** A company may obtain a utility model to protect the functional aspects of the 3D printer, material or printed object. A utility model offers wide-range protection: it covers various embodiments of a single invention and even includes products that were still unknown at the time of the invention.
3. **Brand and Trade Dress:** A company can protect its brand name by registering a trademark or service mark in the form of a word, phrase or design that indicates the provider of the 3D printer or printed product. A brand excludes others who want to use the same or very similar brand. In

addition, a company can register their trade dress to protect the packaging and design of a printed product or even a 3D printer.

4. Trade Secret: A company active in 3D printing should protect its trade secrets with appropriate measures. Business secrets include:
 - Engineering-Know-how
 - Processes
 - Expert knowledge
 - Formulas
 - Operating and financial data
 - Computer programs
 - Lists of customers and suppliers
 - Other information that are undisclosed to the public or generally identifiable and that may provide a business advantage over competitors or customers

The following measures can protect business secrets:

- Documentation of trade secrets in paper or electronic form with the data protection notice highlighted on each document
 - Storage of documents in secured locations with log-in and log-out procedure
 - Restricted access to documents
 - Confidentiality agreement with each party that has access to the trade secrets
5. Copyright: A company may use copyright to protect the creative expression (not the function!) of instruction files, printed objects or even 3D printers. The copyright holder has the exclusive right to reproduce and market the protected work.
 6. Digital Rights Management Systems: *Digital Rights Management* (DRM) allows a business to protect the access to its 3D instruction files. The circumvention of the DRM measures constitutes an illegal use of the data and can be punished as an infringement. If an instruction file is placed illegally online, the copyright owner may require the service provider to delete the instruction file.

Applicable Chinese Law

1. Trademark Law

Companies offering 3D printing are unlawful when they print objects for customers which are illegally branded and have already been registered by a third party at the Trademark Office. Here, the § 5 law against unfair competition of the PR China in connection with the § 52 trademark law of the PR China become effective.

Trademarks can only be protected in China if they are registered with the Trademark Office or if they are considered to be a well-known trademark under the § 13 Trademark Law. Currently, there is no possibility of defense in the Chinese trademark law through fair or private use ("fair use" or "private use").

In China, the conditions for registering 3D trademarks are basically the same as for 2D trademarks. The crucial criterion is distinctness. An example of the protection of prestigious brands and 3D brands is the Coca-Cola bottle, which is not registered in China but still protected.

2. Patent Right

According to § 2 of the Patent Law of the PRC, designs (e.g. objects from 3D printing) can be registered with the patent administration department of the State Council (SIPO) and protected against imitation. However, since no test of the prior art for the registration of a design is carried out, a third party can contest the novelty of the design even after the declaration and hence, obtain the annulment of protection.

A registered design is protected for 10 years; there is no option of extension.

3. Copyright

Works of art in 2D or 3D (e.g. photographic works, technical drawings, product designs, computer software) are protected under § 3 of the Copyright Law of the People's Republic of China. § 22 of the Copyright Act regulates the legal use of works that are subject to copyright by third parties. Above all, private use and distribution in excerpts with a reference to the author are permitted. The private reproduction of an artistic work with the 3D printer is not a problem under current law. Commercial 3D printing of copyrighted works is punishable.

The Copyright Law of the PRC is currently being revised. It remains to be seen whether the amendment will include specific regulations for the regulation of 3D printing.

Conclusion: Efficient Protection is Feasible

In the wake of developing 3D printing possibilities, the protection of intellectual property might become more complicated, but it is not impossible. When printing and fax machines became part of 1990's private households, pessimists predicted the end of copyright protection for authors and journalists. At that time, various licensing systems and online enforcement regulations emerged, and IP defense capabilities were limited. 3D printing, too, will open up new ways to protect IP rights.

There are already systems today that are being created for the effective protection of IP rights in 3D printing. For example, the research company *Create it REAL* has developed a new platform for 3D printing focusing on IP protection. Users can print 3D files, but will be denied access to the original file. Data is directly activated with a process chip on the 3D printer; the system acts as a kind of encryption technology for 3D printers.

IP rights owners cannot effectively protect their 3D printing works by copyrighting CAD files. However, making additional technical drawings and records of the details of the product in question makes it possible to build a protective barrier. It allows to take legal action against those (e.g. providers of 3D printing or CAD files) who facilitate third parties to counterfeit. The patenting of the specific 3D printing method for producing a specific 3D object can also provide legal starting points.

To conclude: Companies are most likely to adequately respond to 3D printing-related challenges by:

- Avoiding legal violations through professional research
- Building a barrier that combines copyright and targeted patent applications.

Further Information and Contact

Find further information about our services on the research and analysis of Chinese patents under:

Flyer Research and Analysis of Chinese Patents

<https://www.chinabrand.de/en/competencies/intellectual-property-and-know-how.html?file=files/content/en/competencies/intellectual-property-and-know-how/Research-and-Analysis-of-Chinese-Patents.pdf>

Flyer Anti-Counterfeiting in China

<https://www.chinabrand.de/en/competencies/counterfeiting-and-piracy.html?file=files/content/en/competencies/counterfeiting-and-piracy/Anti-Counterfeiting-in-China.pdf>

Flyer Investigation in China

<https://www.chinabrand.de/en/competencies/counterfeiting-and-piracy.html?file=files/content/en/competencies/counterfeiting-and-piracy/Investigation-in-China.pdf>

Flyer Intellectual Property Competitive Intelligence

<https://www.chinabrand.de/de/innovation-und-wettbewerb.html?file=files/content/de/kompetenzen/innovation-und-wettbewerb/Intellectual-Property-Competitive-Intelligence.pdf>

Video Research and Analysis of Chinese Patents (in German)

<https://www.youtube.com/watch?v=7QOWvJsBEqQ&t=166s>

Video Counterfeiting and Product Piracy in China– Trends and Strategies of the Forgers (in German)

<https://www.youtube.com/watch?v=wBwECsY60vg&t=3s>

Video Fighting Chinese Counterfeiting and Piracy (in German)

<https://www.youtube.com/watch?v=f3EcR7bQq8Q&t=1s>

Blogbeitrag Fourth Industrial Revolution: Asian Companies Leap Forward

<https://en.blog.chinabrand.de/2018/01/04/fourth-industrial-revolution-asian-companies-leap-forward/>

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Grashofstrasse 3, 80995 Munich

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+49 89 32 12 12 80