

Intellectual Property Rights in an Additive Manufacturing Environment



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Unless otherwise stated, the paper below is based on the legal system of the European Union as at the date of publication.

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1. INTRODUCTION

As additive manufacturing (“AM”) becomes more viable for industrial production, manufacturers are turning their attention to the protection of the intellectual property (“IP”) rights in an AM environment. This paper seeks to examine the IP rights that may be present in designs and other information that is routinely transferred and shared in the additive manufacturing process. Only when the designer of a product has a clear picture of the IP rights that he holds, can he make an informed decision about what technical, contractual and other measures to put in place to avoid unauthorised access to, and copying of, his designs.

There are a number of reasons, set out below, that the approach to the protection of IP rights should be different when taking advantage of the unique benefits of AM.

1.1. REMOTE OR DISTRIBUTED MANUFACTURING

One of the key benefits delivered by AM is the ability for organisations to manufacture physical products closer to the point of demand. This is because, once the optimum means for manufacture of a product on a specific piece of hardware (this will include the design itself and many manufacturing parameters that dictate how the hardware operates during manufacture), the design file, along with the manufacturing parameters, can be sent for production to any manufacturing location operating the same hardware. This means that design files are more likely to be widely distributed than in a traditional manufacturing environment.

1.2. EASE OF UNLAWFUL MANUFACTURE

Precisely because it is possible to manufacture the relevant product at any site with the correct hardware, it is much easier in an AM environment for a third party, who has obtained the design file and (potentially) the necessary production parameters, to make a copy of the product without the consent or co-operation of the design owner.

1.3. DIFFICULTY IN DETECTING UNLICENSED PRODUCTS

It is generally relatively easy now for design owners to differentiate between their genuine products and unlawful copies. This is because the manufacturing process will be different in some way (to varying degrees) leading to a different final product. The very advantage of AM, being able to remotely produce identical parts at the point of need, also makes it inherently difficult to identify unlicensed products that enter the marketplace. This is of particular concern to the aerospace, automotive and medical industries due to potential safety issues. However, these are the very industries that are driving forward the take-up of AM processes in industry.

2. INTELLECTUAL PROPERTY RIGHTS – AN OVERVIEW

IP rights can be either **registered** with an official body such as the US Patent and Trade Mark Office (“PTO”) the UK Intellectual Property Office (“IPO”) or the European Office for the



Harmonisation of the Internal Market (“OHIM”), or **unregistered**. Unregistered rights arise automatically on the creation of the work.

Registered rights include patents, trademarks and registered designs whereas unregistered rights include copyright and unregistered designs.

Each of these IP rights is examined in turn below.

1.1. PATENTS

Patents are granted to an inventor of an invention and give protection for the new and inventive features of a product or process by granting the inventor (or his or her employer) a legally protected monopoly over the right to “work” the invention. Generally, this monopoly right will last for 20 years in most countries but there are certain exceptions, such as for medical products that have to undergo a lengthy testing process before commercial exploitation.

To be eligible for patent protection, the product or process must be:

- a) novel, in that it adds to the state of the art in question;
- b) inventive, so not obvious to a person skilled in the art;
- c) capable of industrial application; and
- d) not specifically excluded from protection (such as is the case for computer software and business methods).

Crucially, the process of obtaining patent protection for an invention involves disclosing the invention to the extent necessary for a person skilled in the art to work the invention. In the case of a product patent, the claim filed and made public should therefore contain all information necessary for a person skilled in the art to manufacture the patented product.

1.2. TRADE MARKS

Trademarks are signs or symbols used in the course of trade in order to indicate the origin of the goods or services to the consumer. This enables the trader to distinguish his goods or services from those of his competitors and to generate goodwill in his brand.

While we are all familiar with trade marks in the form of words that are affixed to packaging (e.g. *Coca-Cola*), there are many other less well known forms of trade mark, such as colours, sounds, smells and, importantly for the purpose of this paper, the shape of the product itself. However, the rules governing the protection of product shapes as trade marks are complex and will be dealt with further below.

1.3. COPYRIGHT

Copyright protect original artistic, dramatic, literary or musical works (and certain other less important categories in some territories). Copyright arises automatically on the creation of the work and lasts for a fixed period beyond the death of the author of the work (generally 70 years in the European Union).



Whereas patents seek to protect an idea, copyright merely protects the expression of the idea and will only be infringed by actual copying, so it is not a monopoly right. However, there are acts that will constitute copying of an artistic work that do not involve like-for-like copying. For example, making a 3D model of a two dimensional artistic work (a film or a comic strip for example), will in certain circumstances constitute infringement of the copyright.

1.4. DESIGN RIGHTS

Design rights are possibly the least understood of the principal IP rights. Design rights protect the appearance of part or all of a product.

Registered Design Rights confer a legal monopoly of the owner for a maximum period of 25 years, provided they are renewed at 5 yearly intervals. Registration of designs is relatively common in industries such as fashion where the appearance of the product is key to its value but registrations are less common in industrial fields.

Unregistered design rights provide for protection against copying. There has been some harmonisation of the system in the European Union but many countries (including the UK) have kept a national system in place alongside the European system. In the United States, there is some protection for Trade Dress and Design Patents but not unregistered designs whereas in Japan, unregistered designs are protected through the Unfair Competition Prevention Act.

1.5. CONFIDENTIAL INFORMATION

Although the legal protection for confidential information is not, strictly speaking, an intellectual property right, it is often considered alongside other IP rights because of the nature of the information protected.

In order to qualify for protection, the information must be:

- a) Confidential in nature;
- b) Imparted in circumstances where an obligation of confidence arises; and
- c) The unauthorised use of the confidential information must cause a detriment to the person who originally disclosed it.

The key difference between confidential information and IP rights is that the redress for the unauthorised disclosure of the information is only against the person to whom it was originally disclosed under the obligation of confidence. There is no redress against the third party that the unauthorised disclosure is made to. This is therefore an automatically arising legal obligation between two parties rather than an IP right. However, it can be relevant in an AM environment so will be considered further below.



3. PATENTS IN ADDITIVE MANUFACTURING

Patents are a powerful and popular¹ means of protecting IP. Generally patent applications can be broken down into **product claims**, which seek to protect features of the product itself, such as an innovative design that makes the product more efficient or effective, and **process claims**, which seek to protect the process used to manufacture the product, such as a means of creating an internal lattice structure in a product or of sintering metal powder to create a solid object.

The crucial factor to be borne in mind when considering elements of a design or process that are patented (or where a patent has been published but not yet granted) is that one of the requirements for patentability in virtually all jurisdictions is sufficiency of disclosure, which is the requirement that the invention be disclosed in a manner that is clear and complete enough for it to be performed by a person skilled in the art². Some may therefore feel that there is little or no point in taking any further measures to protect the patentable elements of the product as anyone is free to view the patent specification in order to obtain these.

However, a patent will often describe an invention in terms of a range of values or attributes, so the dimensions of a feature or element of the product to be protected may be described by a range rather than a specific number. This is because:

- a) the inventor may not have refined his invention sufficiently in order to ascertain the exact dimensions or other values at the time of filing of the patent; and
- b) claiming for a range of values gives the inventor protection against the marketing of an almost identical product of slightly differing dimensions.

It has been recognised by the courts that the patent specification need not “spell out every detail” of the invention, merely sufficient for it to be performed³.

Generally, the final product that is sent for manufacture by the patentee will not merely be an implementation of the patented invention but will also be the result of further research and development work, the outcome of which will have dictated many of the features of the final product.

While it is true that a third party who gains access to this additional information will still not legally be able to make use of it in manufacturing a patented product unless he obtains a licence for the patentee, the information may be of commercial use to a competitor.

Process claims are largely outside the scope of this paper as, in the AM workflow, the means of producing the end product from the design file will generally be dictated by the manufacturing hardware, which will itself likely be protected by a large number of patents relating to processes such as the operation of the laser or electron beam. Such hardware is now becoming increasingly advanced and customisable so that many production variables such as the laser intensity, slice

¹ In 2013, 609,052 patent applications were made to the US Patent and Trademark Office. USPTO US Patent Statistics Chart, available at http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm

² See for example European Patent Convention 2000, Articles 83

³ Valensi v British Radio Corp. [1973] RPC 337, 375



thickness and orientation of the product within the build chamber can be dictated in advance. All of these may form part of the manufacturing process but are unlikely to be protected by patent. These will be dealt with in further detail under **Confidential Information** below.

4. TRADE MARKS IN ADDITIVE MANUFACTURING

The final product into which the AM generated parts are included will doubtless be marketed to its final customers under some form of trade mark but that is of no concern when considering the protection of the design of the AM component.

However, it is worth being aware that there are some product shapes that are capable of registration⁴ but only if the shape is comprised of at least some “non-essential” elements⁵. This is to ensure that the trade mark and patent systems do not unduly overlap and also because a designer cannot claim that elements that are essential to the functioning of a product were added in order to distinguish it as a product that emanated from that designer.

Shapes that have been afforded protection by the trade mark system include the shapes of:

- a) Heads of electric razors⁶;
- b) Car radiator grilles⁷; and
- c) Kitchen knife handles⁸.

If a design that is to be manufactured through an AM process contains or comprises a shape that is a registered, it will be unlawful for a third party to market goods by way of reference to, or incorporation of, that shape in their product in marketing similar goods, if there is a likelihood of confusion on the part of the consumer⁹.

However, such instances are likely to comprise a very small proportion of AM generated parts so it is reasonable to assume that trade mark rights will seldom be particularly relevant.

5. COPYRIGHT IN ADDITIVE MANUFACTURING

Copyright arises without the need for registration and lasts for up to 70 years from the death of the creator of the work. Generally, the only class of works capable of copyright protection that will be relevant for AM are artistic works. This is because a CAD file itself does not meet the

⁴ In *Yoshida v OHIM*, case T-416/10 (8 May 2012) (GC), [24], the European Court of Justice held that “the legislation made no distinction between three-dimensional and two-dimensional shapes” when considering trade mark registrability.

⁵ *LEGO Juris v OHIM*, case C-48/09P [2010] ECR I - 8403

⁶ *Philips Electronics BV v Remington Consumer Products* [1998] RPC 283

⁷ *General Motors v Yplon*, Case C-375/97 [1999]

⁸ *Yoshida v OHIM*

⁹ Regulation (EC) No. 207/2009 of 26 February 2009 on the Community trade mark



qualification for copyright in either Europe or the United States (despite some surprising confusion on this point from the IPO in the UK¹⁰) unless it is in itself an artistic work (or derived from an artistic work).

There are certainly circumstances where a work may be considered artistic and, although such cases may generate much media interest¹¹, they are of little relevance to industrial 3D printing so it is fair to assume that copyright protection is confined to designs aimed at the consumer marketplace.

If a design is deemed to be sufficiently artistic, making 3D models based on the design will be an infringement of copyright. However, there are two key caveats to be borne in mind:

- a) In many jurisdictions, the term of protection is shorter if the design is put into industrial production. For example, in the UK, once 50 units of a product have been produced using an industrial process¹², the scope of protection is reduced to 25 years from the date of first production; and
- a) The interpretation of what is an artistic work can vary dramatically across jurisdictions so it is very difficult to have confidence in the level of protection afforded¹³.

As copyright is not a registered right, the only means of gaining any confidence in the enforceability of the protection afforded is by testing this through the courts. In most circumstances, it is best therefore not to rely solely on copyright protection to prevent the manufacture of unauthorised industrial products based on a 3D design.

There are likely to be many obvious cases in the business to consumer (B2C) marketplace where designs made available for AM are (reasonably) clearly based on an earlier, artistic work. In such cases, copyright protection will provide the IP owner with a basis for legal action after the event. The historical experience of the music industry has shown us that a right to litigate against an individual after illicit copying has occurred does little to prevent the wide distribution of unlicensed copies¹⁴. However, it is important to note that much national copyright legislation (following extensive lobbying from the music industry) contains provisions enabling rights owners to take

¹⁰ See "A Legal and Empirical Study into the Intellectual Property Implications of 3D Printing" published by the UK Intellectual Property Office 20 January 2015

¹¹ See for example the reported action by Katy Perry's lawyers against those who made available a CAD file based on a costume worn by one of her dance team <http://edition.cnn.com/2015/02/09/entertainment/feat-left-shark-legal-irpt/>

¹² It is not currently clear whether AM would constitute an industrial process, particularly in circumstances where the products are customised for manufacture rather than all being identical. However, until there is legal clarity, the author's view is that the prudent approach would be to consider AM to be an "industrial process".

¹³ In *Lucasfilm Limited and others v Andrew Ainsworth and another 2008 EWHC 1878 Ch*, the UK courts considered an alleged copyright infringement following the reproduction of costumes and concluded that the actions would have constituted an infringement of copyright under US law but not under UK law.

¹⁴ When creators, corporations and consumers collide: Napster and the development of on-line music distribution, T McCourt, P Burkart - Media, Culture & Society, 2003



action against internet sites making unlicensed copies available and that this has proven to be a reasonably effective means of protecting digital content.

6. DESIGN RIGHTS IN ADDITIVE MANUFACTURING

Design rights are considered to be the intellectual property right that is both least understood and that has been subject to the least international standardisation¹⁵. International conventions such as the Berne Convention¹⁶ contain but a single article on designs¹⁷ and even more recent international agreements such as TRIPS¹⁸ contain only two¹⁹.

It is unique among intellectual property rights in that there is both a registered and unregistered version²⁰. Although there are numerous registered and unregistered design rights at the national level, this paper will focus on the European registered and unregistered designs and the system of protection for designs in the United States.

Registered Community Design

The Registered Community Design of the European Union (“RCD”) is managed by the Office for the Harmonisation of the Internal Market in Alicante, Spain (“OHIM”). Currently, OHIM registers approximately 80,000 designs every year²¹ across the 27 countries of the European Union. To put this figure into context, it represents less than 20% of the designs available on www.thingiverse.com, a single 3D printing design website²². It follows, therefore, that the vast majority of designs being used in AM are not registered as RCDs.

That is not to say that an increase in the registration of such designs is the appropriate means of protecting against illicit copying. The requirements for a RCD are such that the design must be shown to:

- a) The designer must show that the design was first made available to the public within the EU²³.
- b) be new, in that no identical design has been made available to the public²⁴; and

¹⁵ B. Sherman & L. Bentley, *Intellectual Property Law, 2nd Edition*, Oxford University Press 2004 at p.593

¹⁶ Berne Convention for the Protection of Literary and Artistic works of 9 September 1886 (latest version Paris 1971) (“Berne”)

¹⁷ Berne, article 20

¹⁸ Agreement on Trade Related aspects of Intellectual Property Right 1994

¹⁹ TRIPS, articles 25 and 26, which require signatory states to protect independently created industrial designs that are new or original and that such protection should be for a minimum of ten years.

²⁰ The Registered Community Design, governed by Regulation on the Community design 6/2002 of 12 December 2001, and the Unregistered Community Design, governed by Directive 98/71/EC of the European Parliament and of the Council of 13 Oct.1998 on the legal protection of designs

²¹ <https://oami.europa.eu/ohimportal/en/designs>

²² see <http://www.thingiverse.com/about>

²³ CCR, article 11

²⁴ Council Regulation (EC) No. 6/2002 of 12 December 2001 on Community Designs (“CDR”), article 11



- c) have individual character, so that the informed user would form a different overall visual impression from that which he would form from looking at competing designs²⁵.

At first glance, it would seem that the RCD may be appropriate for many ²⁶AM designs. However, that will often not be the case for a number of reasons:

- a) If the product has previously been manufactured through a subtractive process, the design will fail the test for novelty.
- b) Where the item is to be incorporated into a complex part, individual character will be judged based on only the visible area of the part²⁷. In many cases, the AM generated part will not actually be visible so no legal protection will be afforded.
- c) Designs that are dictated purely by their technical function cannot be protected. This will be the case for many AM generated parts as one of the key benefits of AM technology is the ability to optimise for technical function without the design constraints inherent to subtractive manufacturing.
- d) What is known as the “must fit/must match” exclusion precludes the protection of designs elements that are to fit or match another product²⁸. This means that many spare parts (a key market for the AM industry) will not be protected.

There will be some limited circumstances where the RCD would provide appropriate protection for a design that has been optimised for AM but, in the majority of cases, it will either fail the initial criteria or be caught by one of the exclusions.

Unregistered Community Design

There is a degree of protection in the EU that arises automatically for designs, without the need for registration²⁹.

The first important point to note is that this is not a protection against a third party bringing to market an identical competing product (as is the case with the RCD and, effectively, patent protection). The protection for unregistered designs extends only to preventing actual copying of the design itself.

As with the RCD, the design must be new and form a different impression on the informed user than other existing products on the market. This raises the same difficulties in respect of the visibility of the AM generated part in the overall product that comes to market.

Protection for unregistered designs is a mere 3 years from the date that the design is first made available in the EU (compared to 25 years for the RCD) which is very unlikely to be seen as

²⁵ CDR, article 6

²⁶ CDR, article 8(1)

²⁷ CDR, article 4(2)

²⁸ CDR, article 8)(2)

²⁹ CDR, article 11



sufficient for industrial parts. However, it may be of more useful application in consumer products, particularly where there is a relatively quick product development cycle.

7. CONFIDENTIAL INFORMATION AND CONTRACTUAL PROTECTIONS

As noted above, a design file will often be automatically protected as information that is inherently confidential. However, the protection of confidential information is governed by national rather than international law so will vary widely from one legal jurisdiction to another. For illustrative purposes, the analysis below is based on the law in England and Wales.

The design file would need to satisfy the following criteria³⁰:

- a) the information must be capable of protection;
- b) the defendant must owe a duty of confidence to the claimant; and
- c) the defendant must have breached that duty.

Historically, it has been difficult for the holders of confidential information to make out their cases as even showing that the information (in our case, the design) is capable of protection can be legally difficult. In a leading case involving the protection of confidential designs³¹, the courts ruled that the designs were not protected as confidential information because a considerable number of documents (in this case 246) changed hands, some of which were entirely confidential and others only partially so. In the digital age, it is highly likely that many documents will pass from a designer to a manufacturer during a project and not all will be entirely confidential.

The second challenge in relying on legal protection for confidential information is the extent to which a third party disclosure is bound. This is a crucial aspect for a design owner as there is little benefit in being able to pursue the disclosing party if a third party has unfettered access to the design. Case law has shown that there is little legal certainty on this point³².

For these reasons, designers are unlikely to be comfortable in relying solely on the legal protection of confidential information.

By far the most common practice in industry is for designers, and those that they disclose to, to enter into a non-disclosure agreement ("NDA"). These are important documents that set out the obligations of the receiving party in respect of the information, or in this case, the design. NDAs provide an important element of contractual protection for design owners and are vital in impressing the confidential nature of designs on the recipient and helping to encourage the correct

³⁰ *Coco v Clark* [1969] RPC 41

³¹ *Suhner v Transradio* [1967] RPC 329

³² *Attorney General v Guardian Newspapers (no2)* [1990] AC109 (the "Spycatcher" case), *Stephenson Jordan & Harrison v McDonald & Evans* (1951) 68 RPC 190



behaviour in respect of the design. However, they do have some serious flaws that many who use them may not have fully considered:

- a) The NDA will only bind the first recipient of the design. Once confidentiality is breached and the design is in the hands of a third party (who is not party to the NDA), the agreement itself will be of little use in pursuing that third party.
- b) Most NDAs will contain a clause to state that damages will not be a sufficient remedy, designed to assist the disclosing party in gaining an injunction to prevent (further) disclosure. However, this is of little assistance if the breach is discovered after the design has been disclosed (as will almost always be the case) as the damage is done.
- c) It may not always be possible to know who the disclosing party was. Unless files are watermarked (which is not particularly easy with AM designs), the design owner may know that his design has been disclosed to an unauthorised person but not who is the party in breach. It will not in such cases be possible to enforce the NDA.

NDAs have become so widespread in industry and so few people who enter into them on a daily basis have ever sought to enforce one through the courts, that an erroneous and unjustified confidence has built up in the security that these agreements give the disclosing party.



8. CONCLUSION

The frequent discussions in the AM industry around the ownership of IP rights in 3D design files as they make their way from designer to manufacturing bureau to client are generally based on a misunderstanding of the degree of legal protection available. For the reasons set out above, there will frequently be little or no legal protection available for the design files used in additive manufacturing.

Contractual means of protecting designs are useful in encouraging appropriate behaviours by third parties but are of little use once confidentiality is breached and the design is “in the wild”.

Given the low level of legislative or contractual protection available, it would be wise for businesses seeking to protect their designs to seek technological means of doing so. There are a number of technical means available to do this, the most appropriate for the AM industry being:

- d) data streaming: the design file is not sent to the manufacturer but is instead streamed directly to the hardware. This is a relatively low level of protection but has a low technical and administrative overhead so is ideal for low value parts being manufactured by consumers on their own hardware.
- e) file encryption: the design file is encrypted (ideally using a public:private key system) and sent to the manufacturer. The encrypted design file is then fed directly into the hardware where it is decrypted and manufacturing can then take place. This is a very secure system but has a higher technical and administrative overhead so is more appropriate for higher value designs and parts being manufactured at service bureaux or remote sites.

Technical protection measures and digital rights management have been tested and established in other industries that have moved previously from the widespread movement of physical goods to a widespread transfer of digital files. The music and video industries are the obvious examples in the consumer arena but commercial organisations have been grappling for decades with the danger of transferring digital files between parties while retaining confidentiality. Many systems have been established for use by banks, governments and sensitive industries such as defence. This experience can be leveraged by the AM industry to ensure that the huge benefits that AM can offer are not offset by poor design security.

If the potential of AM is to be realised through the implementation of distributed manufacturing, the industry must do so in a way that protects valuable designs from being copied without consent.



Grow Software is a developer of secure manufacturing solutions for the Additive Manufacturing industry. Grow Secure™ is a free encryption tool that uses 3072 bit RSA public:private key encryption to protect design files from unauthorised access, modification and manufacture.

Grow Software provides specialist advice to industry on the protection of design files throughout the Additive Manufacturing workflow.

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