

CAD Files and European Design Law

by **Viola Elam***

Abstract: Three-dimensional printing (“3DP”) is an additive manufacturing technology that starts with a virtual 3D model of the object to be printed, the so-called Computer-Aided-Design (“CAD”) file. This file, when sent to the printer, gives instructions to the device on how to build the object layer-by-layer. This paper explores whether design protection is available under the current European regulatory framework for designs that are computer-created by means of CAD software, and, if so, under what circumstances. The key point is whether the appearance of a product, embedded in a CAD file, could be regarded as a protectable element under existing legislation. To this end, it begins with an inquiry into the concepts of “design” and “product”, set forth in Article 3 of the Community Design Regulation No. 6/2002 (“CDR”). Then, it considers the EUIPO’s practice of accepting 3D dig-

ital representations of designs. The enquiry goes on to illustrate the implications that the making of a CAD file available online might have. It suggests that the act of uploading a CAD file onto a 3D printing platform may be tantamount to a disclosure for the purposes of triggering unregistered design protection, and for appraising the state of the prior art. It also argues that, when measuring the individual character requirement, the notion of “informed user” and “the designer’s degree of freedom” may need to be reconsidered in the future. The following part touches on the exceptions to design protection, with a special focus on the repairs clause set forth in Article 110 CDR. The concluding part explores different measures that may be implemented to prohibit the unauthorised creation and sharing of CAD files embedding design-protected products.

Keywords: Community design; CAD file; 3D printing; EUIPO; disclosure; informed user; spare parts; scope and criteria of protection; infringement

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A. What is three-dimensional printing and what is a CAD file?

1 The term “three-dimensional printing” (“3DP”) can be considered as an umbrella term that stands for a set of related technologies building physical objects by the consecutive addition of liquids, sheet or powdered materials in ultra-thin layers. Hence, in contrast with traditional “subtractive manufacturing” technologies, which mostly rely on the removal of material (e.g. cutting, drilling and milling), 3DP is an “additive manufacturing” technology. The peculiarity about 3DP is that every physical object is created directly from a digital file, the so-called Computer-Aided Design (CAD) file. The latter is a virtual 3D model that serves to send information to the printer on how to build the object.

- 2 A CAD file can be obtained in different ways. First, it can be created from scratch, by using modelling software (“CAD software”). A number of open-source software tools are freely available online. They enable individuals with no prior experience in 3D modelling to create their own designs, with some programs providing pre-rendered shapes¹. Furthermore, many websites offer tutorials on modelling best practices to assist users who are not design professionals².
- 3 Second, an existing object could be turned quickly into a virtual 3D model by using a 3D scanner. The latter is a device that collects a huge amount of data from a real-world object, by means of lasers

1 E.g. *FreeCAD*, *Sketchup* or *ThinkerCad*.

2 For example, *Sculpteo* provides a tutorial for users of the “*Sketchup*” 3D modelling software, available at: <http://www.sculpteo.com/en/tutorial/prepare-your-model-3d-printing-ketchup/>.

or x-rays. Hence, it reproduces a high-resolution and accurate digital model of the scanned object (“3D visualization”). Third, photogrammetry is a valid alternative to 3D scanning. It is a photography technique that uses software tools for stitching a series of 2D photographs – taken from different angles – together into a 3D model.

- 4 A CAD file can be saved in different formats, such as the .stl format (“STereoLithography”) or the .amf format (“Additive Manufacturing Format”). The .stl format merely describes the surface geometry of a three-dimensional object as a set of triangular faces, whereas the .amf format is an XML-based format inclusive of information about the volumetric structure of the interior, composition, colour, geometry and material.
- 5 At a second stage, CAD files need to be processed, in order to become printable. Hence, a (CAD or scanned) 3D model has to be segmented into a number of layers by specialized software, so-called “Computer-Aided Manufacturing” software or “slicer”. The latter generates a G-code for each layer, which contains commands to tell the printer how to manufacture the object³. The slicing programs are usually included with the printer or available online for download⁴.
- 6 It emerges from the above considerations that three consecutive steps have to be followed in an ordinary 3DP process: the creation of a virtual 3D model; the deconstruction of the 3D model into a series of slices (“slicing”), which are sent to the 3D printer through a computer code; the final print, consisting in a layer-by-layer deposition of suitable materials.
- 7 3DP has gained a wider distribution among the general public in recent years. The launch of Open Source Hardware initiatives, such as the “Replicating Rapid Prototyping” (“RepRap”) project⁵, together with the expiration of a number of key patents on 3D printing technologies, have contributed to a steady improvement in the quality of personal 3D printers and to a considerable reduction in hardware costs⁶. The technology has, therefore, crossed over into

the consumer sphere, with over 100,000 desktop 3D printers having been sold so far⁷.

- 8 Furthermore, online platforms dedicated to the dissemination of CAD files (“digital-design-file-sharing”) have grown in popularity. These platforms have contributed to the creation of a communication infrastructure that is a powerful tool for co-creation. They enable individuals to connect to a vast and distributed network, where they can upload, download, edit, remix, share or indeed sell a CAD file, from which a 3D printed product will emerge.
- 9 Some recent studies, conducted by Rayna et al.⁸, Moilanen et al.⁹, and Mendis et al.¹⁰, provide examples of the diversity of existing 3DP platforms. The latter include platforms, such as *Thingiverse*, where users license their CAD files – rather than selling them – under Creative Commons licences (CC) or General Public Licence (GPL). By using CC licences, the CAD file’s proprietor can withhold certain rights (e.g. the right of attribution and the right to make derivative works), and impose that derivatives should be licensed under the same terms as the licence of the original CAD file (the “Share Alike” clause). Furthermore, the “Non Commercial Use” clause restricts the possibility for the licensee to use the CAD file for commercial purposes.
- 10 Other platforms, such as *Cuboyo*, offer paid downloads to users’ CAD files (i.e. the 30% of the sale price goes to the website, whereas the remaining 70% goes to the seller)¹¹. Moreover, online platforms, such as *Shapeways* and *Sculpteo*, offer printing and delivery services on demand. Taking as an example the architecture of *Sculpteo*, the 3DP process takes place in the following way: individual users upload their CAD files onto *Sculpteo* website; *Sculpteo* automatically repairs any defect and optimizes the digital blueprint, with its own 3D tools; then, it prints the object and delivers it to costumers in finished form, charging a price for its activities.
- 11 Whether personal 3DP will reach its full potential in

3 The CAD and CAM functions could also be integrated into a single CAD/CAM program.

4 E.g. *Slic3r*, *Cura* and *Skeinforge*.

5 This project was launched by a research team at the University of Bath. The idea was to create an open source 3D printer capable of reproducing its own spare parts. The specifications of the hardware (e.g. CAD files, mechanical drawings, diagrams, etc.) were made freely available online for anyone to use, modify and update. The *RepRap* project could be realised because key patents, covering the fused deposition modelling technique, had expired.

6 Before 2009 the cheapest personal 3D printer on the market was offered for around €15,000. Today, the price for a personal 3D printer ranges from €500 to €2000.

7 Mendis, Secchi, report commissioned by the UK Intellectual Property Office, *A Legal and Empirical Study of 3D Printing Online Platforms and an Analysis of User Behaviour* (March 2015), p. 2.

8 Ranya, Striukova, Darlington, *Open Innovation, Co-Creation and Mass Customisation: What Role for 3D Printing Platforms?*, T. D. Brunoe et al. (eds.), Proceedings of the 7th World Conference on Mass Customization, Personalization, and Co-Creation (MCPC 2014), Aalborg, Springer (2014).

9 Moilanen, Daly, Lobato, Allen, *Cultures of Sharing in 3D Printing: What Can we Learn From the Licence Choices of Thingiverse Users?*, *Journal of Peer Production* (6), Disruption and the Law (2015), available at: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2440027>.

10 *Supra* note 7.

11 Moilanen et al. (2015), *supra* note 9, p. 4.

the near future is not altogether clear yet. For the time being, 3D printing by individual makers reveals major technical limitations to seriously hinder the market for quality products. The 3DP community is still a small niche, and the dissemination of CAD files on the Internet is not a mass phenomenon yet. So far, digital-design-file-sharing shows a high level of participation by 3DP enthusiasts¹². Furthermore, to date, there is only evidence of IP infringement occurring on a small scale, on online platforms such as *Thingiverse*¹³.

- 12 Having noted that, the speed of technical developments in consumer 3D printing is undeniable. The level of precision and accuracy attainable by a desktop 3D printer is steadily rising. The price of printing material has dropped drastically, and the technology has also become faster, more reliable and cheaper.
- 13 Furthermore, there are continuous attempts to make 3D printing more easily accessible and affordable for the average consumer. To give a recent example, an Italian company specialized in rapid prototyping and digital fabrication, called *Solido 3D*, came up with one of the latest innovation in 3DP. It developed a device, named “OLO”, which enables printing 3D objects directly from a smartphone¹⁴. Because of its size, weight, and battery power source, this device is considered as the first portable 3D printer, available for sale at the price of \$ 99¹⁵.
- 14 It is therefore maintained that, although personal 3D printers are still far from being ubiquitous, it is just a matter of time until ordinary people will manufacture – directly from a digital file – an increasing number of items at the comfort of their home. Furthermore, in the event that products are not capable of being printed by means of personal 3D printer, it is possible to outsource the actual manufacture to bureau services, such as *Sculpteo* and *Shapeways*. Users can create online shopfronts, where they display their own CAD files for products. The Internet operator will then 3D print the product on demand and deliver it worldwide.

12 Based on data extracted from 17 online platforms, the total number of downloads, for the time-period 2008-2014, is around 40.000. See Mendis, Secchi, UK Intellectual Property Office (2015), *supra* note 7, p. 28.

13 See Hamdi, *IP Law vs 3D Printing: the 5 Worst Examples*, Trickle blog (September 18, 2015). Retrieved February 7, 2016 from <<https://www.trickle.com/blog/ip-vs-3dp/>>.

14 See <www.olo3d.net>.

15 OLO is a crowd-funded project, launched on *kickstarter* on March 21, 2016. The aim of the developers of this portable 3D printer was to raise \$ 80.000 in one month, whereas they reached this goal in just thirty-three minutes. At the end of the fundraising campaign, they collected \$ 2,321,811 with 16,180 backers from all over the world.

I. Is a CAD file a computer program?

- 15 An emerging body of literature has addressed the question of whether CAD files warrant copyright protection¹⁶. Some scholars have suggested that the definition of computer programs is perfectly compatible with CAD files¹⁷. The present writer, however, rejects former existing assumptions on the application of this analogy.
- 16 As noted above, a CAD file simultaneously encompasses both a “design drawing component” and a “code component”. The latter serves to give a series of instructions to the printer (i.e. where to move the print head and how fast to deposit the material). Even if a CAD file embeds a code, it is not the equivalent of a computer program. This in light of the fact that the designer of a CAD model does not write the code herself, at least not directly.
- 17 As noted by Dolinsky, “the CAD designer ... “creates” the code necessary to print the object only by creating the design”, whereas the CAD software programmer has already predetermined the code associated with a pre-made shape or a free-hand drawing¹⁸. It is therefore only the CAD software that finds protection under the Software Directive 2009/24/EC, not the CAD file itself.
- 18 Although an enquiry on the copyright status of CAD files goes beyond the purposes of the present analysis, it is here suggested that a CAD file merely serves as the medium in which a copyright protected work (i.e. artistic work) is recorded. To the extent that the design drawing component of the CAD file is the expression of the author’s creativity, and is not dictated by purely functional considerations, it may qualify as a copyright protected work. By contrast, the file itself is just the medium in which the work is recorded. The fact that the work exists in digital file format does not change its nature. In this respect, a CAD file bears a certain similarity to other files,

16 Among others: Rideout, *Printing the Impossible Triangle: The Copyright Implications of Three-Dimensional Printing*, *The Journal of Business, Entrepreneurship & the Law* (2011), 5(1); Simon, *When Copyright Can Kill: How 3D Printers Are Breaking the Barriers Between “Intellectual” Property and the Physical World*, *PIPSELF* (2013), 3; Weinberg, *What’s the Deal with Copyright and 3D Printing*, available at <<https://www.publicknowledge.org/news-blog/blogs/whats-the-deal-with-copyright-and-3d-printing>> (2013); Dolinsky, *CAD’s Cradle: Untangling Copyrightability, Derivative Works, and Fair Use in 3D Printing*, *Washington and Lee Law Review* (2014), 71(1); Mendis, *Clone Wars Episode II – The Next Generation: The Copyright Implications Relating to 3D Printing and Computer-Aided Design (CAD) Files*, *Law, Innovation and Technology* (2014), 6(2).

17 See, among others, Bradshaw, Bowyer, Haufe, *The Intellectual Property Implications of Low-Cost 3D Printing*, *SCRIPTed* (2010), 7(1), p. 24.

18 Dolinsky, *supra* note 16, p. 641.

such as JPG or PDF files, which respectively embed a photograph or a literary work.

- 19 Therefore, the distinction between what is the work of authorship, as opposed to the medium of its expression, takes on a particular significance when claiming copyright protection of CAD files.

II. Aim of the present analysis

- 20 This paper explores whether design protection is available under the current European regulatory framework for designs that are computer-created by means of CAD software, and, if so, under what circumstances. The key point is whether the appearance of a product, embedded in a CAD file, could be regarded as a protectable element under existing legislation. To this end, it begins with an inquiry into the concepts of “design” and “product”, set forth in Article 3 of the Community Design Regulation No. 6/2002 (“CDR”). Then, it considers the EUIPO’s practice of accepting 3D digital representations of designs. The enquiry goes on to illustrate the implications that the making of a CAD file available online might have. It suggests that the act of uploading a CAD file onto a 3D printing platform may be tantamount to a disclosure for the purposes of triggering unregistered design protection, and for appraising the state of the prior art. It also argues that, when measuring the individual character requirement, the notion of “informed user” and “the designer’s degree of freedom” may need to be reconsidered in the future. The following part touches on the exceptions to design protection, with a special focus on the repairs clause set forth in Article 110 CDR. The concluding part explores different measures that may be implemented to prohibit the unauthorised creation and sharing of CAD files embedding design-protected products.

B. Designs in the European Union

- 21 For the purposes of the Community Design Regulation (“CDR”), “design” means “the appearance of the whole or a part of a product”¹⁹. While there is no definition of appearance, Article 3(a) CDR provides a non-exhaustive list of elements that one may have to consider, for appraising the external aspect of a product. These elements include the lines, contours, colours, shape, texture and/or materials of the product itself and/or its ornamentation. These features are all perceivable by the human eye or by the sense of touch, whereas sounds and smells are

not contemplated²⁰. Yet the CDR does not make the eye appeal a necessary prerequisite for registration.

- 22 Furthermore, as noted by the European Commission in the 1991 “Green Paper on the Legal Protection of Industrial Design”²¹, the external aspect of a product is of considerable economic importance. The notion of appearance, therefore, should be broad enough to encompass any economic value attached to the aspect of a product.
- 23 Article 3(b) CDR goes on to define a product as “any industrial or handicraft item other than computer programs”. It then offers some guidance as to the type of designs that are eligible for protection. The latter include both three-dimensional designs, such as packaging and get-up, and two-dimensional designs, such as graphic symbols and typefaces²². Designs of parts of products, for which no assembly is required, and designs of component parts, which are intended to be assembled in a larger complex product, can also be protected²³.
- 24 The concept of product, therefore, is central to the whole structure of the CDR. The essence of a design is the appearance of a product. Furthermore, as explained below in more detail, there should be a product, to which the design is applied, in order to commit an infringement.
- 25 The following enquiry aims at analysing whether the appearance of a product that is represented digitally as a CAD file may attract design protection under existing EU legislation.

I. The visual element of a CAD file

- 26 The ultimate generation of designs created by means of CAD software embed all information that is needed to define the outer appearance of a product. Embedded data can describe the geometry, as well as the colours and materials of the product. In this respect, the design-drawing component of a CAD file differs from traditional blueprints or technical drawings. In most cases, blueprints only define the geometrical aspect of an object. They may be seen as graphical abstractions of the intended product that need to be interpreted by a human being.
- 27 CAD files, instead, may define all the properties

¹⁹ Article 3(a) CDR.

²⁰ See Suthersanen, *Design Law: European Union and United States of America*, 2nd edn., Sweet and Maxwell (2010), p. 95.

²¹ European Commission, Green Paper on the Legal Protection of Industrial Design, June 1991, at 2.1.2.

²² The list of products enumerated in this provision is not intended to be exhaustive.

²³ Article 3(c) CDR.

and attributes of the product to be printed. They may contain the entire product design that, when printed, will be a finished 3D product. In such a case, in parallel with a photograph, the visual element of a CAD file – i.e. the image of the product stored therein – may be regarded as a view of the appearance of the finished product, for which protection is sought.

- 28 The CAD file can be seen as the medium in which the design is first recorded. Hence, as noted below, the appearance of the product embodied therein may enjoy Community design protection, irrespective of whether the product comes into existence or not.
- 29 By contrast, in case where a CAD model does not clearly reveal the outer appearance of the product, it may be allegedly considered as a blueprint protected in class 19-08 of the Locarno classification (i.e. “other printed matters”)²⁴.

II. Digital item embedded in a CAD file: design protection?

- 30 The issue at stake is whether a digital item, which is computer created by means of CAD software and recorded in a CAD file, may attract design protection in its own right, as a graphic symbol.
- 31 At first reading, the notion of a “design” seems to be confined to the appearance of products having some physical form, insofar as the CDR makes express reference to “industrial or handicraft items”, and expressly excludes computer programs.
- 32 Hence, the definition of “product” set forth in the CDR may give rise to a certain degree of uncertainty as to whether a design, that is not applied to a product in the sense of a physical, tangible object, should likewise be considered as a protectable element under existing regulation. The inclusion of graphic symbols in the meaning of products indicates that protectable designs need not be tied to a physical dimension. The European Union Intellectual Property Office (“EUIPO”) guidelines provide some assistance in this respect. The Office’s practice allows registration of screen displays, icons, and other visible elements of a computer program, such as graphical user interfaces (“GUIs”), in Locarno class 14, Subclass 04 (“screen displays and icons”)²⁵.

24 See EUIPO Guidelines for Examination of Registered Community Designs, version of 01/08/2016, at 4.1.1.

25 *Id.*, EUIPO Guidelines, at 4.1.3. Also, the Explanatory Memorandum clarifies that the exclusion provided in the CDR for computer programs does not extend to “specific graphic designs as applied, for example, to icons or menus”. See EU Commission, Explanatory Memorandum on the Proposal for a European Parliament and Council Regulation on the Community Design, 3 December 1993, p. 11.

33 Therefore, design protection appears to cover all digital items – with the sole exclusion of sounds and animated images – that appear on electronic devices, such as computer screens or mobile phones.

34 By contrast, computer programs as such are excluded from design protection. The reason for inserting this exclusion is explained in the Explanatory Memorandum of the first proposal of the CDR. The rationale was mainly to avoid any potential interference with the Software Directive which might arise whenever copyright protection provided under the aforementioned Directive is supplemented or reinforced by a protection of the “look and feel” of a computer program by way of design protection²⁶.

35 In theory, if a computer item is eligible for protection, the digital item represented in a CAD file could likewise enjoy Community design protection. One may argue that, in parallel with other computer icons, the item embodied in a CAD file is a graphic symbol that appears on a computer screen when the file is loaded. Since the CDR enumerates graphic symbols as a category of product of their own, their appearance can be protected under the title of Community designs.

36 This analogy appears questionable, however. There is a substantial difference between a computer icon and a product embedded in a CAD file. The former fulfils its function exclusively once it is displayed on a computer screen. As noted by Margoni, it does not even possess the characteristics to be manufactured or printed into an industrial or handicraft item²⁷. It is “intangible” by its very nature. On the contrary, not only can an item embedded in a CAD file become tangible once it is shown on a computer screen, but it could also be turned into a physical product at the click of a button.

37 In other terms, the reason why a person creates a CAD file is to enable the manufacturing of the object embodied therein. Design rights are vested in the appearance of the product to be made from that file.

38 Having noted that, an applicant may also wish to protect the virtual product per se under the scope of European design law in order to avoid the risk that no protection will be available, should a third party make a digital copy of its design, i.e. creates a CAD file depicting the design-protected product and uploads such CAD file on the Internet. In fact, as discussed below in more detail, Article 19 CDR seems to confine infringing use of a design to use in relation to physical goods or corporeal movables²⁸.

26 *Id.*, Explanatory Memorandum, p. 11.

27 Margoni, *Not for Designers: On the Inadequacies of EU Design Law and How to Fix It*, JIPITEC, (2013), 4(3), p. 232.

28 See below, part G.

39 For the sake of clarity, it seems rather unrealistic to assume, in the absence of a specific provision, that digital items represented in the form of CAD files could be seen as “products”, whose appearance deserves protection in its own right. The definition of “design” would need to be broadened in future legislation in order to cover a wider range of “immaterial” protectable elements.

III. CAD drawings as graphical representations

40 Under current practice, the drawing component of a CAD file may serve as a “graphic representation” of the design for which protection is sought. The following analysis attempts to clarify this point.

41 A person seeking protection for their design at the EU level has the option to either apply for a Registered Community Design (“RCD”) through the EUIPO, before disclosing it, or, alternatively, opt for an anti-copying right, relying on Unregistered Community Design (“UCD”) protection.

42 In the former case, in order to have a valid application for a RCD, Article 36 CDR requires to include “a representation of the design that is suitable for reproduction”. There are several ways in which a design can be represented. The EUIPO accepts drawings, photographs and computer-made representations (i.e. CAD representations), either in black or in colour, provided that they are of quality, permitting all details of the design to be clearly distinguished²⁹.

43 Hence, it may well be that, in parallel with a photograph, a CAD representation is used to disclose the features of the design for which protection is sought. By way of explanation, if the applicant wishes to register the design of a table knife, rather than affixing a photograph of such a knife, she can affix the 3D representation, created by CAD software, of the same household good. The applicant will then have to indicate “knives” as the relevant product category (class 7-03 of the Locarno classification)³⁰.

44 However, in order to be of quality, a CAD representation should enable to determine, with clarity, the subject matter of the protection afforded by the RCD to its holder. Hence, it should contain clear and intelligible information about the sizes, dimensions, and colours of the item in which the

design is incorporated or to which the design is applied.

45 Interestingly, a recent decision from the UK Supreme Court, *PMS International Group Plc*³¹, is notable for stressing the importance of the images affixed in the application form, for determining the scope of Community design protection. As noted by Lord Neuberger, when it comes to deciding the extent of protection afforded by a RCD, the question “must ultimately depend on the proper interpretation of the registration in issue, and in particular of the images included in the registration”³². Therefore, it will almost always be the images that “exclusively identify the nature and extent of the monopoly” which the applicant is claiming³³.

46 The case concerned an alleged infringement of a RCD, which consisted of six images prepared by CAD software of an item (a ride-on animal suitcase) whose main body appeared as a uniform grey, but which had black strips in the front, a black strap on the top and black wheels. After analysing these images, it was not clear whether the two-tone colouring on the CAD images – i.e. the contrast in colour between grey and black – was simply an artefact of the computer-generated process or a visual cue to indicate that the wheels and the strap should be considered as separate components. The problem, therefore, was whether the RCD was to be considered as protection for the shape only, or for the shape in two contrasting colours. Only in the latter case, the overall impression created by this contrast in colour could be considered.

47 It might be, therefore, that CAD representations depict some unnecessary tonal contrast. This, in turn, could generate confusion and be understood as limiting the scope of design protection to certain colours only.

48 The application for a RCD should also indicate the products in which the design is intended to be incorporated or to which it is intended to be applied. In this respect, it is worth noting that product classification mainly serves administrative purposes and does not affect the scope of design protection³⁴. Once the design is registered, it is protected against any use in relation to any product that does not produce a different overall impression on the informed user.

49 Once the request for registration is filed, the EUIPO carries out an *ex officio* examination of the two absolute grounds for non-registrability, set forth in

29 EUIPO Guidelines, *supra* note 25, at 3.3.1.

30 The EUIPO has recently released an e-filing tool, called “3D image uploader”, that allows the applicant to upload and store its CAD files. The applicant can move the 3D image, zoom in and out, take some pictures from different views, and select between a maximum of 7 static views.

31 *PMS International Group Plc v Magmatic Ltd* [2016] UKSC 12.

32 *Id.*, at 30.

33 *Id.*, at 31.

34 EUIPO Guidelines, *supra* note 25, at 6.1.4.1.

Article 47 CDR. Namely, the Office verifies whether the subject matter of the application corresponds to the definition of a design foreseen in Article 3(a) CDR, and whether or not it is contrary to public policy and accepted principles of morality. Therefore, the registration procedure is kept to a minimum. Compliance with the novelty and individual character requirements will only be examined at a second stage if a third party submits an application for a declaration of invalidity.

- 50 It should also be noted that the EUIPO examines whether the appearance of the “product” is disclosed in the light of the design itself. Whether the product is actually made or used, or can be made or used, in an industrial or handicraft fashion, is not taken into consideration³⁵. In fact, there is no requirement to submit a specimen of the claimed RCD.
- 51 This, in turn, implies that a person can: create a CAD file for a product by means of CAD software; include in the application for a RCD an image taken from such a CAD file; obtain a design registration covering the product design represented therein, irrespective of whether the product is actually manufactured or not.
- 52 This leads to the outcome that, although the entire regulatory framework in EU design law is structured on the concept of “product”, a design is protectable regardless of whether a product comes into existence or not. Accordingly, legal protection does not depend on whether designs represented as CAD models exist as tangible articles or not.

C. Unregistered design protection of CAD files

- 53 An Unregistered Community Design (“UCD”) is based on the same substantive provisions postulating the validity requirements for a RCD. The meaning of “design”, “appearance” and “product” are the same for both RCD and UCD. As a general matter, any design capable of being registered at the EU level could also benefit from the protection granted to UCD.
- 54 There are, however, substantial differences between RCD and UCD. A RCD confers a true monopoly, whereas an UCD grants the right to prevent any commercial use of a design that is an intentional copy of the protected one. Yet, it should not be demonstrated that the alleged infringer acted in bad faith. Furthermore, a RCD confers protection for up to 25 years, subject to renewal each five years, whereas an UCD affords protection for only three

years.

- 55 Protection of the UCD commences from the date on which the design has been “made available to the public” within the EU. As Recital 16 CDR puts forth, there is no need to register products having a short market life. A designer can introduce a new design testing the market and file an application for registration at a second stage. In fact, the designer is entitled to register her design within a 12-month period (“grace period”) from the date of the first disclosure. In other words, in the event that the designer files an application for a RCD, disclosure during the year preceding the date of filing shall not be taken into consideration when appraising novelty and individual character of the design in question, pursuant to Article 7(2) CDR.
- 56 Let us now assume that a CAD file for a product to which a design is applied is uploaded onto a website which is a 3DP marketplace or repository. This, in turn, raises a number of questions. Should the act of uploading a CAD file onto an online 3DP platform be tantamount to a disclosure of the design to the public, which triggers UCD protection? Has the design been “made available to the public”, and become known in the normal course of trade? Has the 12-month grace period commenced?
- 57 The following part of this paper detects the circumstances under which a design shall be deemed to have been made available to the public. The phrase “made available to the public”, for the purposes of identifying the date on which UCD protection commences, is defined under Article 11(2) CDR. This provision mirrors Article 7(1) CDR, which clarifies when a design has been disclosed for considering questions of novelty and individual character, for both registered and unregistered designs. In fact, all designs made available to the public, prior to the relevant date (indicated at Article 5(1)(a)&(b) and 6(1)(a)&(b)), are to be taken into account to determine whether a design is new and if it has individual character. This, in turn, raises an additional question: should we consider all the CAD models that have been previously uploaded onto 3DP online platforms as antecedent designs in the prior art?
- 58 It should also be noted that a disclosure should take place within the territory of the European Union in order to create an UCD. Hence, UCD protection is not afforded to designs that have first been made available outside the EU. On the contrary, this requirement is not imposed under Article 7 CDR, which defines the notion of disclosure that is relevant for determining the state of the prior art.

³⁵ *Id.*, at 4.1.

D. The concept of “made available to the public”

- 59 Articles 7(1) and 11(2) CDR provide some guidance to assess whether a design has been ‘made available to the public’. This is the case if “it has been published following registration or otherwise, or exhibited, used in trade or otherwise disclosed”. The following part of these provisions set forth the so-called “safeguard” clause, stipulating that a disclosure shall not be taken into consideration if these events (publication, exhibition, and use in trade) could not have become known “in the normal course of business to the circles specialised in the sector concerned”, operating within the Community.
- 60 The EUIPO³⁶’s case law from 2004 onwards allows enough clearance on which acts constitute a disclosure of a design to the public, which could also become known in the normal course of business to specialised circles.
- 61 A remarkable ruling that helps us to understand better whether the publication of a CAD file on an online platform would amount to a disclosure to the public is the Board’s decision in *Crocs, Inc. v Holy Soles Holdings Ltd*³⁷. The holder of a RCD for Crocs clogs, which was published in the Bulletin of 8 February, 2005, conceded that the design had already been published on www.crocs.com before 28 May, 2003. Nonetheless, the right owner argued that such disclosure on the website did not destroy novelty of the design in question, since it could not have reasonably become known in the Community.
- 62 At that time, the website was unsophisticated and virtually impossible to access. The website merely functioned as an information tool for persons “who might have learnt about the clogs from people who had already bought them” and was not used as a large mail order service. Websites that will be regarded as a source of inspiration for developing new designs are those of the established footwear companies, such as *Nike* or *Adidas*, whereas *Crocs Inc.* was not an established manufacturer at the relevant date³⁸.
- 63 The Third Board of Appeal dismissed the appellant’s findings. In the first place, the Board found that the Internet is a formidable information tool and is used by designers in footwear as well as in other fields as a resource in the development of their designs. Moreover, *Crocs* website was an active website
- already at that date and was configured to function as a sales channel. Henceforth, the audience targeted by the website was not only composed by those who knew *Crocs* from before³⁹.
- 64 Accordingly, when a design is published on a website, it will *per se* be publicly disclosed and reasonably become known in the normal course of business, even if the circles specialised in the sector were not aware of the website owner at that date⁴⁰. This is further confirmed in recent case law from the EUIPO. As a matter of principle, information disclosed on the Internet or in online databases forms part of the prior art and is considered to be publicly available as of the date the information was posted⁴¹.
- 65 Moreover, neither restricting access to a limited circle of people (for example, by using password protection) nor requiring payment for access (in the same way as requiring a payment for subscribing to a journal or purchasing a book) prevent a webpage from being part of the prior art. The European circles specialised in the sector concerned could reasonably meet the accessibility requirement⁴².
- 66 A disclosure shall be deemed to be obscure and irretrievable only in situations in which a design disappears from mankind’s memory over time and is available only in a local museum or traded on a remote local market. This is not the case for prior designs made available online. Users – either the broad public or experts in a particular field of industry – use the service of web browsers, such as *Google* or *Yahoo*, to search on the Internet. By using keywords, they can easily find websites dealing with a particular subject matter. Therefore, once a design is published on the Internet it becomes automatically accessible and retrievable⁴³.
- 67 For the purposes of applying Articles 5 and 6 CDR, a disclosure could also take place outside the EU, insofar as the design has become known in the trade circles in the European Union. The question of whether events taking place outside the EU could reasonably have become known to persons forming part of specialized circles in the EU is a question of fact, dependent on the particular circumstances of each individual case⁴⁴. In theory, even where the

36 Formerly called Office for Harmonization in the Internal Market (“OHIM”).

37 OHIM Third Board of Appeal, decision of 26 March 2010 – R 9/2008-3.

38 *Id.*, at 10(d).

39 *Id.*, at 85-92.

40 Suthersanen, *supra* note 20, p. 126.

41 OHIM Invalidity Division, *Mariusz Adamski Adams Group v Abakus Direct Ltd*, decision of 10 July 2014, at 13. In the present case the holder had disclosed its design on *eBay* prior to the RCD’s filing.

42 OHIM Invalidity Division, *Napco Beds B.V. v Leopold Meijnen Oosterbaan*, decision of 24 February 2015, at 13.

43 OHIM, Invalidity Division, *Samsung Electronics CO. Limited et al. v Apple Inc.*, decision of 05 July 2013, at 70-71.

44 See the CJEU’s ruling in *H. Gautzsch GroBhanden GmbH & Co. KG v Munchener Boulevard Mobel Joseph Duna GmbH*, C- 479/12,

design has been disclosed to a single undertaking within the EU, a disclosure of that kind may, indeed, be sufficient for that purpose⁴⁵.

- 68 Making a design available overseas, therefore, may destroy novelty on the basis that Article 7(1) CDR is not geographically restricted to the EU. On the contrary, the same disclosure taking place outside the EU may not be sufficient to commence UCD protection, given the territorial qualification contained in Article 11(1) CDR⁴⁶.
- 69 It is therefore maintained that, in principle, the act of uploading a CAD file onto an online platform should be a sufficient ground for “disclosing” the design represented therein, for the purposes of applying Articles 5 and 6 CDR. A CAD file is retrievable and easily accessible by Internet users, including experts in the field. This might be the case for both CAD files that have been made available to the public, subject to a Creative Commons licence, and those offered for sale in 3DP marketplaces.
- 70 It follows that whether the design is new and has individual character would need to be considered, taking into account the already-available body of designs, including all antecedent CAD files that have been previously disclosed. In other words, product designs embedded in CAD files that have already been distributed online will form part of the state of the prior art⁴⁷.
- 71 The publication of the CAD file on a EU website can also trigger UCD protection from the date of the first online publication, if the criteria for protection (i.e. novelty and individual character) are met. The designer would then have the option to register the design within one year.
- 72 An unsettled issue is whether UCD protection is activated if the CAD file is first uploaded onto a website that is hosted outside the EU (such as *Thingiverse*). If the website is easily accessible by European users, a positive answer may appear as more appropriate in light of the above-mentioned case law, which focuses on the retrievability of Internet publications, whereas a literal interpretation of Article 110a (5) CDR may suggest the opposite.

at 34. See also OHIM Board of Appeal, *Kirschenhofer GmbH v WS Teleshop International Handles-GmbH*, decision of 11 July 2007.

45 *Id.*, *H. Gautzsch GroBhanden GmbH*, at 15.

46 See the decision of the German Federal Supreme Court of October 9, 2008, *Gebäckpresse I* ZR 126/06, [2009] GRUR 79.

47 More precisely, in order to pass the novelty and individual character test, the design embedded in the CAD file shall differ from all the designs made available before: the date on which the file itself was published on the 3DP website, with respect to UCD; the date of filing or validly claimed priority, with respect to RCD.

- 73 It should also be noted that the CAD file made available online should clearly reveal the outer appearance of the product for which protection is sought. Lacking a clear representation of the product design, the act of publishing the CAD file on a website will not constitute a relevant disclosure for the purposes of Articles 7 and 11 CDR.
- 74 The option of making CAD files available online, therefore, constitutes an interesting possibility for those designers that want to prevent third-parties from using their 3D models to obtain design protection⁴⁸. When the CAD file is disclosed, all later designs will have to produce a different overall impression on the informed user.

E. Requirements that a design has to meet towards design protection

- 75 Articles 5 and 6 CDR state that a design has to be new, has to have individual character, and must not fall foul of any of the stipulated exceptions, in order to enjoy design protection. These requirements will be analysed in turn, focusing on the implications that 3DP carries.

I. Novelty and individual character

- 76 A design is new only when it differs materially from everything that has been produced before. In fact, Article 5(2) CDR states that differences between two designs are irrelevant whenever they relate to mere “immaterial details”. In this regard, the novelty requirement is much closer to that for utility patents, rather than the originality requirement for copyright protection. It follows that users who download already-existing CAD models from a 3DP platform will have to modify them substantially in order for their designs to be new.
- 77 In this respect, a critical issue that 3DP poses is whether customized designs differ materially from other designs that have been made available before. Today, many companies, such as *eMachineShop.com* or *Shapeways*, manufacture customized products based on consumers’ CAD files. From an IP perspective, a key issue is whether customized products provide “added value” because they imprint true novelty, or because they just enhance the value inherent in the design of the core product. It may well be that customized designs lack in novelty, since they differ from the core product design in details that are immaterial, banal or commonplace.

48 Margoni (2013), *supra* note 27, p. 241, at 113.

- 78 Novelty and individual character overlap to a certain extent. The main difference between these criteria lies in the kind of examination carried out by the EUIPO. When assessing novelty, the EUIPO makes a comparison between the overall appearances of the two designs. In contrast, when measuring individual character, the EUIPO considers the overall impression that the design produces on the “informed user”. Therefore, any reference to the informed user is not justified when assessing novelty. It is the Board’s task to measure the differences between the designs under examination on the basis of their overall appearance⁴⁹.
- 79 The test for individual character is less straightforward and is likely to give rise to slightly more subjective appraisals⁵⁰. In *Karen Millen Fashions*⁵¹, the CJEU held that, in order for a design to be considered to have individual character, the overall impression which that design produces on the informed user must be different from that produced on such a user “not by a combination of features taken in isolation and drawn from a number of earlier designs, but by one or more earlier designs, taken individually”.
- 80 Therefore, the assessment as to whether the product design embedded in a CAD file has individual character must be conducted in relation to individualised, defined and identified designs that have been made available to the public previously.
- 81 Furthermore, in its recent decision in *H&M Hennes & Mauritz BV*⁵², the CJEU held that the assessment of the individual character of a Community design is the result of a four-stage examination, which consists in deciding upon: first, the sector to which the products belong; second, the identity of the informed user of those products; third, the designer’s degree of freedom in developing his design; fourth, the outcome of the comparison of the designs at issue. The designer’s degree of freedom cannot, on its own, give rise to an outcome as regards the assessment of individual character, but can only “reinforce” this evaluation. The starting point should always be the perception of the informed user.
- 82 The problem is how to carry out the four-stage examination of the individual character requirement with respect to CAD files. In order to be protectable, a product design in the form of a CAD file should produce an overall impression on the informed user that differs from the impression produced by all previous designs. Therefore, such a design will only pass the individual character test if it differs from: a) any CAD file for a product that has been previously uploaded onto a 3DP platform; b) any product that has already been marketed.
- 83 The situation is further complicated by the contention that the informed user of an item represented as a CAD file might need to be distinguished from the informed user of the corresponding physical product. Arguably, the former should be the user of a 3DP platform, who wants to 3D print the item, rather than the person who purchases the product in a retail store.
- 84 Let us assume that a CAD file represents a bottle opener, and that a later CAD file depicts a similar bottle opener. In potential litigation, the informed user for assessing the individual character requirement of the disputed design could be: a private individual who drinks wine; a professional (e.g. waiter or sommelier); the user of a 3DP platform, who wants to manufacture the bottle opener at home.
- 85 Therefore, a number of issues need to be addressed. Who is the informed user of CAD files? How should we evaluate the degree of freedom of the CAD file’s designer? Will the individual character threshold become less strict in the future if the market sectors become overcrowded? The next paragraph suggests some possible answers to these questions.

II. The “informed user” in the 3D printing landscape

- 86 For the purposes of this analysis, it is worth asking, in the first place, who would be the notional informed user, if an increasing number of individuals engage in the creation of CAD models and in digital-design-file-sharing. Everyone can now design a product from scratch by using CAD software. Users can also download third parties’ CAD files and use online tools to transform, adapt or recast the pre-existing designs. Individual makers are both users and designers. Hence, the following analysis suggests that, if it becomes common practice that people not only print but also design their own product at home, the notion of informed user might need to be revisited in the future. It argues that informed users would tend to belong to the circles specialised in the sector concerned, and resemble the “person skilled in the art” in patent law.
- 87 The legal concept of “informed user” differs from that of “average consumer” in EU trademark law. The possibility of imperfect recollection on the

49 OHIM Third Board of Appeal, *Imperial International Limited v Handl Cookware Limited*, decision of 2 September 2008, at 11-12.

50 OHIM Third Board of Appeal, *Daka Research Inc. v Ampel 24 Vertiebs-GmbH & Co. KG*, decision of 22 November 2006, at 20.

51 *Karen Millen Fashions Ltd v Dunnes stores et al.* C-345/13 ECJR 17, at 35.

52 *H&M Hennes & Mauritz BV & Co. KG v OHIM – Yves Saint Laurent (handbags)* T-526/13, at 32-34.

part of the average consumer plays a vital role in trademark law, which is aimed at preventing consumer confusion or deception. To the contrary, design law protects the appearance of a product. This implies that the informed user should not merely half-remembering the articles but also have a certain degree of familiarity with the item goods in which the design is incorporated⁵³.

88 Hence, according to established case law, the informed user shall be particularly observant, aware of the state of the art in the sector concerned, and use the product related to the RCD in accordance with the purpose for which the product is intended⁵⁴. The background knowledge of the items is certainly higher than average, but not even too specific. She is more than a mere consumer, but is less than a design expert. Moreover, Lord Justice Jacob, in *Procter & Gamble Company v Reckitt Benckiser (UK) Limited*⁵⁵, highlighted that the informed user is not the same sort of person as the ‘person skilled in the art’ of patent law. The equivalent to that person in the field of design would be some sort of average “designer”, not a “user”.

89 Originally, the EUIPO’s Invalidation Division adopted a rather different approach. The informed user was found to be a person aware of the prior art known in the normal course of business to “the circles specialised in the sector concerned”. She does not ignore the specific methods and techniques of production⁵⁶. For example, in a case concerning an application for a declaration of invalidity of a RCD for “wheels for bicycles”, the Invalidation Division found that the informed user is aware of the requirements that bicycle wheels must fulfil in order to perform their function. Therefore, the informed user also “takes into account whether the degree of freedom of the designer is limited by the requirement that a wheel has to be laced with the spokes between the hub and the rim and to transfer the weight of the rider to the rim”⁵⁷.

90 It thus seems that the notion of informed user was once much closer to that of a design expert. The Invalidation Division used to consider the informed user as belonging the “circles specialised in the

sector concerned”. Nonetheless, as noted above, this criterion should only apply when establishing what is a relevant disclosure to the public, and potential conflicts with an already-existing design corpus, under Article 7 CDR. The person of the informed user, who is the reference for evaluating individual character, shall not be part of any specialised circle, lacking this sort or requirement in Article 6 CDR.

91 A correct interpretation of these two provisions should be that a design is considered to have individual character if the overall impression it produces on the informed user differs from that of an earlier design, which has already been disclosed to the public. However, a design shall *not* be deemed part of the prior art if not even the circles specialised in sector concerned, operating in the territory of the EU, are aware of its existence⁵⁸.

92 Therefore, in a recent ruling, the Board of Appeal found that the informed user of clogs is “neither the manufacturer nor a seller of clogs, but the person who wears clogs. Without being a designer or a technical expert, the informed user knows the various designs for clogs as a result of the relevant product range offered in retail shops or over the Internet”⁵⁹. In the present context, footwear designers and footwear industry, operating in the EU, represent the circles specialised in the sector concerned.

93 This paper argues that 3DP may blur the distinction between the notions of informed user and that of design expert. Users may become more and more aware of the specific methods and techniques of production. If this is the case, one will have look at early case law from the EUIPO in order to detect who should be considered the informed user, in a new ecosystem where the person of the designer and that of the user conflate to a greater extent.

III. How to evaluate the designer’s degree of freedom

94 Following established case law from the EUIPO, the designer’s degree of freedom is likely to be lower if she has to comply with technical constraints. Similarly, if a field of application is already very crowded, minor advances from the prior art might produce a different overall impression on the informed user⁶⁰.

53 *Procter & Gamble Co v. Reckitt Benckiser (UK), Ltd* [2007] EWCA Civ 936, per LJ Jacob at 27.

54 Judgement of the General Court (First Chamber), 9 September 2011, in Case T-10/08, *Kwang Yang Motor Co. Ltd. v OHIM*, at 23.

55 *Supra* note 53, at 16.

56 OHIM Invalidation Division, *Eredu S. Coop v Armet S.r.l.*, decision of 27 April 2004, at 18: “in particolare, l’utente informato non ignora lo stato della tecnica quale è conosciuta nel corso della normale attività commerciale negli ambienti specializzati del settore considerate”.

57 OHIM Invalidation Division, *Rodi Commercial S.A. v ISCA S.p.A.*, decision of 30 August 2005, at 27.

58 See, *inter alia*, opinion of Advocate General Wathelet, 5 September 2013, in case *H. Gautzsch Grobhanden*, *supra* note, at 44.

59 OHIM third Board of Appeal, *Hessy s.r.o. v Crocs, Inc.*, decision of 14 September 2015, at 16.

60 By way of example, the OHIM third Board of Appeal, in *Mafin S.p.A. v Leng-D’Or S.A.*, decision of 4 November 2010, at 20-21, found that the presence of so many shapes for

- 95 On the one hand, when applying this reasoning to 3DP, one could maintain that the designer's degree of freedom will be gradually reduced. Assuming that an increasing number of users and companies will start producing and distributing their own versions of CAD files, and that such files form prior art, many market sectors will be thoroughly soaked. If a specific sector is saturated, it inevitably entails compromises, since minor differences in the appearance of products might be enough to lead to a different overall impression on the part of the informed user. The appearance of a contested design, therefore, might be very similar to that of an earlier design and, nonetheless, lead to a different overall impression.
- 96 Besides, it is worth considering that the designer has to work within certain constraints in order to make a 3D model suitable for printing. In the first place, there are some dimensional constraints. The designer has to comply with height and size requirements in order for the 3D printer to be used. In other words, when designing the 3D model using modelling software, the designer should take into account that printed objects are limited by the printers' size⁶¹. Furthermore, a 3D model should have a minimum thickness, at any given point ("minimum wall thickness"), which depends on the material used. Arguably, all of these technical constraints limit the designer's freedom.
- 97 On the other hand, one may argue that 3DP enhances the designer's freedom, since it enables the creation of much more complex geometries, as opposed to traditional manufacturing processes. Furthermore, individuals have gained the capacity to design all sorts of products with a relatively low experience. It is also possible to find tutorials on the Internet on how to use modelling software, such as CAD software. 3D scanners enable the designer to digitize without difficulty any physical object. The newly-created 3D model can then be modified, adapted and optimized.
- 98 Thus, it is questionable whether the designer's degree of freedom should be considered lower in 3DP than in other design processes. This issue, however, is dependant on whether the technology will or will not become widespread. As noted above, for the time being, individual users engaging in the creation and

"snacks items" is evidence of the broad possibilities open to the designer and, at the same time, the limits thereof. The designer freedom is not limitless, since the overcrowding of the market sector and industrial feasibility of the goods item determine much more constraint on a competing company operating in the same market sector. Accordingly, the designer's degree of freedom was found to be average, rather than broad or limitless, and implying a gradual decline in the shapes that are still available.

61 It is however likely that in the future it will be possible to produce 3D printed products in larger sizes.

sharing of CAD files mainly include 3DP enthusiasts.

F. Exceptions to Community Design protection: the non-harmonisation of the repairs clause

- 99 The scope of design protection for the appearance of items represented as CAD files – and the corresponding 3D-printed products – is narrowed by a series of exceptions, set forth in the CDR. The first functionality exclusion, provided in Article 8(1) CDR, states that a Community design shall not subsist in features of appearance of a product, which are solely dictated by its technical function. Such features shall not only be necessary, but essential to obtain a technical result. Thus, the level of functionality required is higher than that provided under trademark law.
- 100 In a way, such exclusion emulates the idea and expression dichotomy in copyright law. In fact, in the 1991 Green Paper on the Legal Protection of Industrial Design⁶², the European Commission made clear that if the designer has a choice among various forms, in order to arrive at the technical effect, the features in question could be protected. This, in turn, means that features of appearance of a product, represented as a CAD file, will not be granted protection if they are only indispensable for achieving a specific technical result. It does not follow, however, that the whole design will automatically be denied protection.
- 101 Over and above the general exclusion of "technical function", Article 8(2) CDR provides the so-called "must-fit" exception or "interface" exclusion. This exclusion is aimed at enabling technical replacement products and ensuring mechanical interoperability. Hence, no protection is given to those features that must necessarily be reproduced in their exact form and dimension in order to permit the product, in which the design is incorporated, to be mechanically connected to another product (for example, exhaust pipes or coupling sleeves are examples of "must fit" designs in the automotive industry). This permits the possibility that either product may perform its function.
- 102 This provision turned out to be rather redundant, insofar as spare parts, which are not visible in normal use⁶³, and those that are solely dictated by their technical function, are anyway excluded from design protection⁶⁴.

62 At 5.4.6.2.

63 See Article 4(2)(a) CDR.

64 Both the functionality and the must-fit exclusions do not

- 103 One of the most problematic issues the EU legislators had to face concerns the so-called “must-match” exclusion⁶⁵. This exclusion deals with the visual synchronisation and aesthetic appearance of a complex product, rather than with functionality. In other terms, the must-match provision concerns the design of a component part, which should be used for the purpose of the repair of a complex product so as to restore its original appearance (e.g. the design of a car body panel that is used to restore the original appearance of the vehicle).
- 104 The protection of must-match spare parts has occasioned the greatest controversy among a wide range of stakeholders, especially in the automotive industry. The following analysis provides a brief overview of the legislative history on this issue. This will help explain why the dispute is not resolved yet.
- 105 The original idea in the 1993 proposals for a Regulation on the Community design⁶⁶, and for a Directive on the legal protection of designs⁶⁷, was to introduce a must-match exception in Europe, specifying that only after a period of three years, from the first placing on the market of a complex product, the rights conferred by a RCD could not be exercised to prevent third parties from using the design of a component part, in order to restore the original appearance, or to permit the repair of, the complex product. The Council of Ministers rejected this option.
- 106 The European Parliament advanced a different solution in the Amended Proposal for the Design Directive, opting for a compulsory licensing regime that allowed the use of component parts, for repair purposes, immediately after the placing on the market of the complex product, in exchange for a fair and reasonable remuneration of the right holder⁶⁸.
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- apply to design features which allow the multiple assembly or connection of mutually interchangeable products within a modular system (Recital 11, Article 8(3) CDR). Hence, design subsists in interconnection features of construction toys or modular furniture. Cornish et al., in *Intellectual Property: Patents, Copyright, Trade marks and Allied rights*, 7th edn Sweet & Maxwell (2007), p. 613, maintain that the special treatment offered to toy manufacturers has no reasonable explanation, except that it shows how determined lobbying can squeeze special concessions into legislation.
- 65 The “must-match” terminology comes from the UK legislation on UK Unregistered Design Rights. Such exception was first introduced within the UK Community Designs and Patents Act 1988.
- 66 Proposal for a European Parliament and Council Regulation on the Community Design, COM (93) 342 final-COD 463, 3 December 1993, Article 23 of the Draft Regulation.
- 67 Proposal for a European Parliament and Council Directive on the Legal Protection of Designs, COM (93) 344 final-COD 464, 3 December 1993, Article 14.
- 68 Amended Proposal Design Directive [1996] OJ C1 42/7, Article 14.
- Manufacturers of component parts were required to inform the public as to the origin of their products used for the repair by means of a trademark or trade name. They also had to notify the right holder of the intended use of the design, and regularly inform her as to the scale of such use. Nonetheless, no agreement on the compulsory licensing clause was reached by the European Council.
- 107 Ultimately, the disagreement between EU institutions was the subject of a Conciliation Committee meeting, where the Council insisted on its position against a remuneration scheme. It recommended, instead, an extension of the period of exclusivity over component parts for a period ranging from three to seven years.
- 108 In such a tense context, the European Union opted for the so-called “freeze plus” solution, stating that until amendments to the Directive are adopted on a proposal from the Commission on this subject, Member States shall maintain in force their existing legal provisions. Member States should only change their laws if they wished to liberalise their market for spare parts, pursuant to Article 14 Directive 98/71/EC. Therefore, Member States had alternative options: they could introduce a clause allowing any use of the design for repair purposes; adopt a remuneration system; provide a term-limited design protection; or craft their own exception, which is a combination of the second and third options.
- 109 Article 110 CDR codified another “freeze plus” or transitional provision, mirroring the one set forth in the Directive. Thus, in 2004 the Commission made its third attempt to achieve harmonisation in this convoluted area, issuing a proposal designed to liberalise the aftermarket for spare parts⁶⁹. This proposal, known as the “repairs clause”, purported to increase legal certainty and allow market operators and consumers to take full advantage of a uniform Internal Market for spare parts⁷⁰.
- 110 In fact, the situation at that time was characterised by opposed regimes, where nine Member States, including Italy and the UK, have liberalised, whereas sixteen Member States had *de jure* design protection to spare parts (among them, Austria, Denmark, Finland, Germany, Portugal, Sweden). The European Commission found that the *status quo* – with mixed protection regimes of design protection for spare parts – was altogether unsatisfactory and created trade distortion in the Internal Market⁷¹. The non-
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- 69 European Commission (2004), Proposal for a Directive of the European Parliament and of the Council amending Directive 98/71/EC on the Legal Protection of Designs: Extended Impact Assessment.
- 70 *Id.*, at 2.
- 71 *Id.*, at 1.1.1.

harmonisation of the must-match exclusion means that independent manufacturers are only able to sell their products and offer their services in some Member States but not in others.

- 111** Following a lack of progress at Council level, in May 2014 the proposal was withdrawn. Successively, the Commission launched a comprehensive legal and economic evaluation of the overall functioning of EU design systems⁷². In the framework of this evaluation, an external contractor, Europe Economics, presented “The Economic Review of Industrial Design in Europe”⁷³. The latter suggests that, among various policy options, full liberalisation, meaning a complete elimination of design protection for spare parts within the EU, would be the best outcome. In an age of widespread availability of 3D printers, consumers and independent manufacturers think that they are entitled to produce their own 3D-printed spare parts for the purpose of repair. Hence, a *de facto* repairs clause might become inevitable anyway. Insofar as it is impossible to enforce design law against all infringers in the 3DP landscape, a full liberalisation has to take place.
- 112** In response to this argument, one could maintain that 3DP makes the introduction of a repairs clause a more delicate issue than it was in the relatively recent past, because 3D printed products might not meet quality and safety standards. Any proposal for full liberalisation should foresee a method to ensure that component parts are safe and useable, when it becomes possible for different industries to manufacture spare parts using 3DP.
- 113** In a study commissioned by the UK Intellectual Property Office (“IPO”), Reeves and Mendis stressed, in this regard, that it is rather unrealistic to assume that 3DP will be heavily used, in the near future, to make component parts in certain industrial sectors, such as the automotive aftermarket⁷⁴. The component parts that, according to the UK IPO’s study, are not yet suited to additive manufacture include: tyres, batteries, oil filters, air conditioning, etc. There are also aftermarket parts whose manufacture is technically possible by means of 3DP, but not economically viable yet, since the production costs would be higher than the current aftermarket value. The latter include: exhaust pipes, distributor caps, water pumps, and radiators⁷⁵.
- 114** As noted by the authors, one of the biggest limitations to the production of 3D printed spare parts lies in the lack of credible design data from which to print. In the Office’s opinion, it is erroneously “assumed that parts can be simply scanned and reverse engineered, with the resulting data then being stored on the cloud” for downstream 3DP. It is of fundamental importance to have access to the original CAD files, to understand “issues such as tolerances, loading conditions and material requirements”.
- 115** Hence, whether the impact of 3DP on the liberalisation of the aftermarket sector will be significant in the next future is not altogether clear yet⁷⁶.
- 116** For the sake of completeness, it is also worth recalling a recent Order from the CJEU in *Ford Motor Company v Wheeltrims s.r.l.*⁷⁷, dealing with trademark law.
- 117** At first instance, in the Italian proceedings, the claimant *Ford Motor Company* claimed that the defendant, a company operating in the automotive aftermarket, had infringed its registered trademark “Ford”. *Wheeltrims* was marketing wheel caps bearing the registered trademarks of the original manufacturers – including Ford’s trademark – without the owners’ authorisation. The defendant raised the repairs clause defence, arguing that Article 241 of the Italian Industrial Property Code, implementing Article 14 of the Design Directive, should apply as a defence to trade mark infringement. The use of the trademark “Ford” was justified for the purpose of restoring the original appearance of the complex product, in derogation of the Trade Mark Regulation (EC) 207/2009 and Trade Mark Directive 84/104/EC. The Tribunale Ordinario di Torino made a reference for a preliminary ruling to the CJEU on the interpretation of the repairs clause set forth in the DD and CDR.
- 118** The CJEU answered the referred questions by Order, stating that Article 14 of DD and Article 110 CDR must be interpreted as not allowing – by way of derogation from the provisions of the Trade Mark Directive 2008/95/EC and Trade Mark Regulation 2009/207/EC – a manufacturer of replacement parts and accessories for motor vehicles to affix to its products a sign, which is identical to a trademark registered for such products by the original manufacturer, without the latter’s authorisation, on the ground that the use thus made of the trade mark is the only way to restore the original appearance of the complex product.
- 119** Hence, the CJEU has made clear that, in its current

⁷² See <http://ec.europa.eu/growth/industry/intellectual-property/industrial-design/protection/index_en.htm>.

⁷³ Europe Economics, *The Economic Review of Industrial Designs in Europe*, a study commissioned by DG Internal Market and Services (January 2015).

⁷⁴ Reeves, Mendis, report commissioned by the UK IPO, *The Current Status and Impact of 3D Printing Within the Industrial Sector: An Analysis of Six Case Studies* (March 2015), p. 19.

⁷⁵ *Id.*, p. 17.

⁷⁶ According to Reeves and Mendis it will not be significant for the next 10 years. *Id.*, p. 20.

⁷⁷ Order of the CJEU (Third Chamber) of 6 October 2015, Case C-500/14.

form, the repairs clause that is anchored in European design law does provide a defence to an alleged trademark infringement. As a result, a third party who replicates by means of 3DP a component part, to which the manufacturer's own trademark is affixed, may be found liable for trademark infringement, provided that the private use exception does not apply⁷⁸.

G. Exclusive rights conferred by a design

120 In the event that a design is registered, the holder of a RCD is granted an exclusive right to use it and to prevent any third party not having her consent from using it. Pursuant to Article 19 CDR, the right to use the design covers different sorts of activities, such as the making, offering, putting on the market or using of a "product" in which the design is incorporated. In contrast, an UCD confers the right to prevent the same aforementioned activities, but only insofar as the contested use results from copying the protected design, and is not the result of an independent work of creation.

121 The owner's exclusive rights extend towards any third party, without any differentiation between primary and secondary infringers. This, in turn, implies that the holder of a RCD can pursue claims for direct infringement against intermediaries (e.g. online 3D platforms).

122 Furthermore, as already mentioned, infringement is not confined to the use of the design on the same product, in which the design was incorporated in the first place. Protection extends toward any use of the design, in relation to any products. It is also worth remembering that infringement cannot occur with respect to acts done privately and for non-commercial purposes⁷⁹, and acts done for experimental purposes (Article 20 CDR).

123 In light of the above considerations, the question of whether 3D printing a design-protected product from a CAD file constitutes or not an infringing activity is straightforward. There is no doubt that the acts prohibited under Article 19 CDR will encompass the manufacture of objects via 3DP, that is done in the context of a commercial activity and outside the

scope of the private use exception (i.e. "making" the design)⁸⁰. Infringement will not be actionable, instead, against an individual, who 3D prints a design product at home, for private and personal use.

124 Moreover, the fabrication of products, by means of 3DP, done for scientific research will be exempted, irrespective of whether it is for a private or commercial purpose⁸¹. As noted by Suthersanen, this exception should be interpreted narrowly and be only allowed if the experimental usage of the design is in the general interest. A demarcation should always be made between acts of experimental nature, and those that seek to exploit the design⁸².

125 Whether the scope of design protection should also include the act of making a scanned representation and/or a CAD file from a design already existing as a tangible article is less clear-cut. Also, does the unauthorized act of copying and marketing a third party's CAD file, in which a design is incorporated, amount to infringement of the design right?

126 The unsolved issue, therefore, is whether activities carried out in relation to CAD files fall foul of Article 19 CDR, and constitute an illegitimate "use" of the design. Moreover, who is the party responsible for the infringement: the one who uploads, downloads or markets the CAD file? Should the host of the file-sharing site be held liable too?

127 A strict interpretation of the law would suggest that the answer to these questions should be no. Just as a design requires there to be a product, infringement should only occur where a person uses a physical product⁸³. The latter should not necessarily be the same product to which the design was incorporated in the first place, but it should however be an industrial or handicraft item.

128 Furthermore, the CDR does not provide protection against indirect use of a design, differently from patent law. There is no specific provision that confers on the holder of a Community design the right to prevent third parties, not having her consent, from supplying the "means" for using the design (e.g. marketing a complete kit that, when made up, constitutes the design)⁸⁴. A CAD file could be seen as a "means" enabling the fabrication of the product in which the design is incorporated. As a consequence,

⁷⁸ According to Article 10 of Directive 2015/2436/EC, in order to commit an infringement the use of a third party's trademark should be "in the course of trade", i.e. in the context of a commercial activity with a view to economic advantage and not as a private matter. See the CJEU's ruling in *Arsenal Football Club plc. v Reed*, C-206/01 [2002] ECR I-10273, [40].

⁷⁹ These criteria are cumulative. Use should be both private and for purposes that are not commercial.

⁸⁰ See Malaquias, *The 3D Printing Revolution: an Intellectual Property Analysis* (8 August 2014), available at: <http://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2495416>.

⁸¹ Article 20(1)(b) CDR.

⁸² Suthersanen (2010), *supra* note 20, p. 140.

⁸³ Bently, Sherman, *Intellectual Property Law*, 3rd ed., Oxford: OUP (2008), p. 666.

⁸⁴ See Article 30 of the Convention for the European Patent for the Common Market (Community Patent Convention) 76/76/EEC.

making and distributing a CAD file would constitute an authorized (indirect) use of the design⁸⁵.

- 129** Therefore, a crucial issue to address is the extent to which a design right can be used against a new form of exploitation that does not imply the making of physical objects, but the creation and sharing of digital files.
- 130** It is here suggested that confining the scope of design protection to use on material products only is overly restrictive, in the light of the current technological change brought about by 3DP. This technology is blurring the line between the physical and the immaterial worlds. An increasing number of undertakings might decide to make their CAD files available online in the course of their business. Digital networks might emerge as an ordinary means of distributing 3DP templates of protected designs. In this way, undertakings would not need to mass-produce or distribute their products any longer.
- 131** Once a design is made available in the form of a CAD file, it then becomes extremely easy for anyone to replicate it, either by entrusting a third party with the task of printing the product, or by using personal hardware. Future advancements in personal 3D printers will further expand this capability. Hence, design-based industries have to be equipped for the digitalization of things. In order for alternative business practices to come to light, it is of utmost importance to ensure that material protected by an IP is respected.
- 132** This, in turn, calls for a reinterpretation of the legal basis on which right holders shall receive protection. Arguably, they should be exclusively entitled to use – and prevent third parties from using and dealing with – the CAD files of their protected designs.
- 133** There are several ways to address this issue. A first option would be to consider the digital representation of a design as a “product” within the meaning of Article 19 CDR. Accordingly, this provision would cover different activities, such as the unauthorized making of CAD files (i.e. the making of a product), sharing of CAD files with other Internet users (i.e. use of the design), and the sale of CAD files on 3DP marketplaces (i.e. offering the product and putting it on the market). Furthermore, a possible interpretation of Article 20 CDR would be that the private use exception exempts from liability a third party who simply downloads a CAD file and saves it on her computer.
- 134** One may support this conclusion arguing that requiring products to have some physical form would

be unduly limiting⁸⁶. From a systemic perspective, it seems rather contradictory to allow registration of graphic symbols – including computer icons – and, at the same time, postulate that the notion of “product” is tied to a physical dimension for infringing purposes.

- 135** Furthermore, the scope of design protection is not limited to a certain category of products; rather, it covers any use of the design, in relation to “any” product that does not produce on the informed user a different overall impression. As noted by Malaquias, it seems very difficult to ascertain that a CAD file “will produce on the informed user a different overall impression from the protected design, considering that its purpose is to replicate the existing design in three-dimensions”⁸⁷.
- 136** In the opinion of the present writer, the preferable solution is to follow the recommendation, made by the European Commission in the “Legal Review on Industrial Design Protection in Europe”⁸⁸, to introduce an infringement provision stating that the creation of a design document amounts to an infringing use⁸⁹.
- 137** As suggested by the European Commission, a template for such provision may be Section 226(1) of the UK CDPA 1988, which states that “the owner of a design has the exclusive right to reproduce the design for commercial purposes [...] by making a design document recording the design for the purposes of enabling such articles to be made”.
- 138** In the UK jurisdiction, “design document” is defined in Section 51(3) CDPA as: “any record of a design, whether in the form of a drawing, a written description, a photograph, data stored in a computer or otherwise”. The scope of this provision is wide enough to include CAD files as design documents⁹⁰.
- 139** Furthermore, EU design law could fashion an additional provision similar to Section 226(3) CDPA 1988, specifying that it is a primary infringement of a design right to do or “authorise” another to do, without the design right owner’s permission,

⁸⁶ This expression is used by Bently and Sherman, *id.*, p. 667, footnote 66.

⁸⁷ Malaquias (2014), *supra* note 80, p. 27.

⁸⁸ MARKTD2014/083/D.

⁸⁹ *Id.* 133.

⁹⁰ It should however be borne in mind that in the UK jurisdiction, pursuant to Section 51(1) CDPA 1988, copyright in a design document (i.e. in the CAD file) will not be infringed by making a 3D article from it, where the design is for anything other than an artistic work or a typeface. Hence, if a CAD file embodies a utilitarian design (for example, the design of automotive spare parts), printing the object will not result in copyright liability. In this respect, the UK model would not be a good model to replicate for the EU.

⁸⁵ Bently, Sherman (2008), *supra* note 83, p. 666.

anything which is the exclusive right of the design right owner.

140 In the first place, this provision would clarify that making a CAD file from an existing design-protected product, for the purposes of 3D printing such product, amounts to an infringement of the design right. This provision would also specify that intermediary parties (such as 3DP online platforms) might also be directly liable for “authorising” design infringement. As stressed in the Commission’s review, the benefit of such a provision is that neither actual nor constructing knowledge would be required for a positive finding of infringement⁹¹.

H. Conclusions

141 A clear message emerges from the arguments developed in this paper. European design law should adapt to the reality of digitized goods and accommodate greater protection for right owners.

142 To date, the EUIPO accepts 3D digital representation of designs as “representations of the design that are suitable for reproduction”, within the meaning of Article 36 CDR. Such a representation is enclosed in the application form for a RCD to show, in the same way as a photograph, the design for which protection is sought.

143 It has also been noted that, although the CDR is structured on the concept of “product”, the EUIPO does not take into consideration whether a product is actually made or used, or can be made or used, in an industrial or handicraft fashion. This, means that, in theory, the CAD representations included in the application for a RCD will determine the scope of design protection, regardless of whether the product is actually manufactured or not.

⁹¹ As an alternative remedy, the European Commission proposes to introduce “indirect design infringement” as a separate head of liability. As noted above, a CAD file may be seen as a “means” that enables the actual infringement of the design right, i.e. as an “indirect” use of a design. In addition, the European Commission focuses on the possibility to review the private and non-commercial use exception. One way to restrict the scope of this exception is to employ the 3-step language adopted in Article 26 of the TRIPS Agreement (“*provided that such exceptions do not unreasonably conflict with the normal exploitation of protected industrial designs, and do not unreasonably prejudice the legitimate interests of the owner of the protected design, taking account of the legitimate interests of third parties*”), in order to provide greater flexibility and achieve a balance between the legitimate interests involved. The latter recommendation does not seem advisable. The language employed in the three-step test may lead to ambiguity and to a non-uniform interpretation. Rather than representing a useful tool, it may create additional confusion. Cf. 6.1 of the report (MARKTD2014/083/D).

144 It has also been contented that in case a CAD file clearly unveils the outer appearance of a product, its publication online will be tantamount to a “disclosure” for the purposes of Article 7 CDR. As a consequence, all later products – and CAD files for products – will have to produce a different overall impression on the informed user. By contrast, it is not entirely clear whether publishing a CAD file on a website that is hosted outside the EU will trigger UCD protection from the date of the first online publication, given the geographical limitation contained in Articles 11 and 110(a) 5 CDR.

145 Hence, there are many issues that have to be clarified. First, who is the informed user of a product represented digitally as a CAD file, as opposed to the informed user of the finished product? Second, is the designer’s degree of freedom enhanced or limited by the fact that she creates a product design using CAD software? Third, if many individuals begin to create their own CAD files for products and upload them online, thereby disclosing the design for which protection is sought, will many market sectors suddenly become overcrowded? Will all subsequent designs have to depart from the considerable amount of CAD models already made available online?

146 Besides, the ease of converting a CAD file into a physical item leads us to suggest that design owners should be entitled to claim protection for the CAD representations of their designs. In a hypothetical world of widespread 3D printers, it could be that CAD files become almost interchangeable with end products. The owner of a CAD file might be as satisfied as if she possesses the end product itself. A CAD file would then serve as a substitute for a good, offered to the same or actual potential customers.

147 Many are the fields in which clear-cut rules are needed, since new technologies empower the individual in her creativity and yet should make her responsible for potential infringement of third parties’ exclusive rights.

148 In this respect, the present writer supports the following recommendations, made by the European Commission in its recent report “Legal Review on Industrial Design Protection in Europe”: first, to introduce a provision that confers upon the design right owner an exclusive right to make a design document, which is a record of the design (i.e. a CAD file); second, to introduce a provision on direct primary infringement by authorisation.

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