STANDARD ST. 91

RECOMMENDATIONS ON DIGITAL THREE-DIMENSIONAL (3D) MODELS AND 3D IMAGES

*Revision approved by the Committee on WIPO Standards (CWS)
at its twelfth session on September 19, 2024*

INTRODUCTION

1. This Standard provides recommendations for Intellectual Property Offices (IPOs) and other interested parties that manage, store, process, exchange or disseminate IP data using digital three-dimensional (3D) models and 3D images.

2. This Standard has the following objectives:

(a) determination of formats that are available, compatible or interoperable with different software used by applicants in order to facilitate their efforts to prepare application materials before filing;

(b) reducing the time of IP application processing by IPOs;

(c) facilitating IP application filing to different IPOs due to adoption of recommended formats among IPOs;

(d) harmonization of requirements for data exchange on subjects for IP rights protection with digital 3D visual representations among IPOs and other organizations; and

(e) set of requirements for the publication of information on subjects for IP rights protection with digital 3D visual representations.

DEFINITIONS

3. For the purposes of this Standard, unless otherwise specified:

(a) 3D model – An electronic file that is created by specialized software, for mathematically representing the surface of an object's visual representation in three dimensions;

(b) 3D Images – Digital images that represent objects displayed in three dimensions such as 3D photos and stereoscopy;

(c) CAD – Computer Aided Design;

(d) 3D PDF – A PDF document that contains 3D models;

(e) IGES – Initial Graphics Exchange Specification;

(f) OBJ – An open geometry vertex file format used for CAD and 3D printing;

(g) MOL/CDX – A text-based chemical file format that describes molecules and chemical reactions;

(h) PDF – The Portable Document Format is a file format developed by Adobe;

(i) Raster image – An image that is composed of a map of points (pixels), referred to as a bitmap. Typical file formats for raster images include JPEG, TIFF, PNG and BMP;

(j) STL – Standard Tessellation Language – a file format native to the stereolithography CAD software created by 3D Systems;

(k) STEP – Standard for the Exchange of Product model data – an open ISO Standard which can represent 3D objects in Computer-aided design (CAD) and related information;

(l) U3D – Universal 3D (U3D) is a compressed file format standard for 3D computer graphics data; and

(m) Vector graphics – An image file that is composed of shapes formed of mathematical formulas and coordinates on a 2D plane. As opposed to raster images, vector graphics have the property of scaling infinitely without any degradation of quality.

REFERENCES

4. The following WIPO Standards and other documents are relevant to the present Standard:

WIPO Standard ST.9	Bibliographic data on and relating to patents and SPCs;
WIPO Standard ST.10	Published patent documents;
WIPO Standard ST.60	Bibliographic data relating to marks;
WIPO Standard ST.63	Content and layout of trademark gazettes;
WIPO Standard ST.67	Electronic management of the figurative elements of trademarks;
WIPO Standard ST.80	Bibliographic data relating to industrial designs;
WIPO Standard ST.81	Content and layout of industrial designs gazettes;
WIPO Standard ST.88	Electronic representation of industrial designs;
WIPO Standard ST.96	Processing of Industrial Property information using XML; and
ISO Standard 10303	Product data representation and exchange standard.

GENERAL RECOMMENDATIONS

5. An application for IP protection may contain a 3D visual representation of an object in the form of a digital 3D model or 3D image in accordance with the requirements of the IPO receiving the application. Applicants can be encouraged to provide a 3D visual representation of the object as supplementary material to the application or as the main visual representation of the object, if specified by the requirements of the receiving IPO.

6. Formats and other characteristics of the received image files (e.g., file size) accepted by each IPO should be according to the recommendations of this Standard. These formats were selected in accordance with the criteria set out in the Annex.

7. If an IPO has previously established its preferred image formats and other characteristics, it is recommended that the IPO announce in its official publications at regular intervals and/or on its websites, the image formats, sizes and other specific characteristics that are acceptable in application filings.

RECOMMENDATIONS FOR 3D MODELS AND 3D IMAGES FORMATS AND FILE SIZE

8. The following recommendations apply to providing application materials for the indicated type of IP rights.

Patent for invention or utility model

9. 3D visual representation of an invention or utility model should preferably be formatted as at least one of the formats: STEP, IGES, U3D, OBJ or STL. Maximum file size should not exceed 50 MB. If required, at an applicant's request the receiving IPO can accept files larger than the said maximum.

10. For chemical structures that are included in patent applications, 3D visual representation should preferably be formatted as CDX or MOL. Maximum file size should not exceed 50 MB.

Industrial design

11. 3D visual representation of an industrial design should preferably be formatted as at least one of the formats: STEP, IGES, U3D, OBJ or STL. Maximum file size should not exceed 50 MB. If required, at an applicant's request the receiving IPO can accept files larger than the said maximum.

Trademark

12. 3D visual representation of a trademark should preferably be formatted as at least one of the formats: STEP, IGES, U3D, OBJ or STL. Maximum file size should not exceed 50 MB. If required, at an applicant's request the receiving IPO can accept files larger than the said maximum.

Integrated circuit topography

13. 3D visual representation of an integrated circuit topography should preferably be formatted as at least one of the formats: STEP, IGES, U3D, OBJ or STL. Maximum file size should not exceed 50 MB. If required, at an applicant's request the receiving IPO can accept files larger than the said maximum.

PROCEDURAL RECOMMENDATIONS FOR FILING AND PROCESSING OF 3D MODELS AND 3D IMAGES

14. If an IPO converts a 3D model or 3D image from formats originally submitted by applicants to formats other than recommended above, or transforms from one storage format to another (e.g. STEP to STL), it is recommended that the IPO retain the original format as well as the transformed format for archival purposes.

15. If an IPO receives a 3D model or 3D image as the only visual representation of an object in an application for IP right protection and needs 2D images, it is recommended to make 2D views of the 3D model in order to ensure compatibility with the IPO's internal systems and processes where only 2D images of objects are required.

(a) For patent applications for inventions or utility models, it is recommended to make seven 2D views of the 3D model, i.e., front, rear, right, left, top, bottom, and perspective views, in an electronic format corresponding to the requirements established by the IPO for 2D images of inventions or utility models.

(b) For industrial design applications, it is recommended to make six 2D views of the 3D model, i.e., front, back, left, right, top, and bottom views, in an electronic format corresponding to the requirements established by the IPO for 2D images of industrial designs.

(c) For trademark applications, it is recommended to make one 2D view of the 3D model, i.e., front view, in an electronic format corresponding to the requirements established by the IPO for 2D images of figurative trademarks.

16. It is recommended that an IPO define a set of guidelines and procedures for converting models and images from 3D to 2D formats.

RECOMMENDATIONS FOR DATA EXCHANGE

17. When IPOs exchange 3D model and/or 3D image data, file formats can be converted from the original formats, if such is established by an IPO. The conversion or transformation from the original file formats should be conducted in accordance with the guidelines and procedures established by the IPOs involved. The following additional requirements are recommended when exchanging application data for the indicated type of IP rights.

Patents for inventions or utility models

18. It is recommended that IPOs and other organizations comply with the following requirements when exchanging 3D models and/or 3D images data incorporated in patent documents:

- At least one of the file formats: U3D, OBJ or STL, STEP, IGES; and
- Maximum file size: 50 MB.

19. For the chemical structures in the patent application, it is recommended that IPOs and other organizations comply with the following requirements when exchanging 3D models and/or 3D images:

- At least one of the file formats: MOL, CDX

Industrial designs

20. It is recommended that IPOs and other organizations comply with the following requirements when exchanging 3D models and/or 3D images incorporated in industrial design applications:

- At least one of the file formats: U3D, OBJ or STL, STEP, IGES; and
- Maximum file size: 50 MB.

Trademarks

21. It is recommended that IPOs and other organizations comply with the following requirements when exchanging 3D models and/or 3D images incorporated in trademark applications:

- At least one of the file formats: U3D, OBJ or STL, STEP, IGES; and
- Maximum file size: 50 MB.

RECOMMENDATIONS FOR ELECTRONIC PUBLICATION AND ONLINE DISPLAY

22. It is recommended that an electronic publication of an object in an IP application or IP right include 3D model and/or 3D image files received by the IPO in the list of published documents relating to the IP application or IP right.

23. Formats of published 3D files can be converted from the original formats, if desired by the IPO. Any conversions or transformations should be conducted in accordance with the guidelines and procedures established by the IPO.

24. For online display of 3D visual representation of an object, the following requirements are recommended:

- At least one of the file formats: U3D, OBJ or STL, STEP, IGES, MOL, CDX: OBJ or STL; and
- Maximum file size: 50 MB.

25. For electronic publication of 3D visual representations of an object in PDF format, it is recommended to create files in 3D PDF embedding the 3D models and/or 3D images in one of the 3D file formats recommended under this Standard. If the original 3D model cannot be embedded in 3D PDF in its original format, then it is recommended to convert the 3D model to one of the 3D file formats recommended under this Standard, or to embed 2D image(s) of the object, preferably as received from the applicant, or as converted by the IPO from 3D formats submitted by the applicant.

26. Paper publication should contain a 2D visual representation of a 3D object and/or a link to the 3D object online.

RECOMMENDATIONS FOR PARTIAL CLAIMING, PARTIAL DESIGN, PORTION DESIGN

27. It is recommended that appropriate depiction of partial claiming of design, partial design, or portion design should be feasible in a relevant 3D format, and disclaimed features in designs should be readily recognizable and understandable.

28. The depictions of partial claiming of design, partial design, and portion design featured in relevant 3D format should be robustly maintained during processing of applications with 3D models or 3D images, e.g., when publishing the applications.

[Annex follows]

ANNEX

CRITERIA FOR SELECTING 3D FORMATS

Revision approved by the Committee on WIPO Standards (CWS)
at its twelfth session on September 19, 2024

The file formats described in this Standard were selected after assessing potential formats that may be recommended according to the five basic criteria set out below, where all criteria were considered equal.

Wide-spread adoption

Objective: This criterion ensures a selection of formats that are widely used by applicants.

Solution: In order to determine widely adopted 3D formats a survey[1] was conducted among IPOs and Industry, where the respondents indicated the formats currently used for processing visual representations of objects for IP right protection.

Openness/accessibility/standardization

Objective: This criterion ensures the format is reproducable in the long-term. For example, some unstandardized formats require the support of certain software and are not intended for long-term use.

Solution: The preference for open formats over proprietary formats was based on this objective for long term use with additionally making sure these formats are accessible to a wide range of users. The standardization is an advantage, and correlates with the long-term storage capabilities of formats, although in some cases standardized formats may be protected by patents.

Specific requirements/stored information

Objective: This criterion ensures the ability to store the mandatory elements of an IP right.

Solution: Various 3D formats have been analyzed to assess their comprehensiveness in storing information about an IP right, including the surface of the 3D object, textures, the possibility of containing several separate parts that can be considered separately during the examination process, etc. Some information relevant to IP right protection, such as chemical formulas and genetic sequences, was considered separately, since 3D visualisation of such objects can be useful both for examination purposes and for the publication of such data, but such objects may differ from the 3D models created using CAD systems or graphic editors.

Cross-platform /software accessibility

Objective: This criterion ensures that the applicant will be able to submit a visual representation in one of the recommended formats and that such published data will be viewable by the general public.

Solution: The possibility of opening and saving such formats in widely-available software that is used to create a visual representation of the objects for IP right protection (CAD, graphic editors), as well as the availability of various software for processing and displaying such formats, was also analyzed.

File size

Objective: This criterion ensures the performance of data processing, storage and publishing information systems.

Solution: The restrictions on file-size for storing, processing, and publishing of such objects were taken into account. For some of the purposes mentioned, formats that stored the necessary information in smaller files were preferred.

[End of Annex and of Standard]

[1] See https://www.wipo.int/export/sites/www/standards/en/pdf/surveys/3dmodels/analysis.pdf