

PRC (Product Representation Compact) Format FAQ

What is PRC?

PRC is a compact 3D file format for representing 3D models and assemblies. It is optimized to store, load, and display various kinds of 3D data, especially for data that represents manufactured products. The data, conventionally generated with computer aided design (CAD) systems, includes product structure, geometry, and product manufacturing information (PMI). PRC is a flexible 3D format that includes all three data forms.

What are the benefits of using PRC?

PRC supports PDF-based documentation workflows and can also be used as an independent, 3D visualization file format. By using PRC, documents can be created that are interoperable with Computer Aided Manufacturing (CAM) and Computer Aided Engineering (CAE) applications. PRC supports documentation requirements for design reviews, as well as distribution of detailed design documentation to supply chains. In addition, its use can help support regulatory mandates which require the use of open standards.

Specifically, PRC supports the following data forms:

- Allows storage of large CAD files in a highly compressible form that is a fraction of the original size. The complete product structure of the parts defined by the CAD system is contained in a PRC file.
- Can represent Product Manufacturing Information (**PMI**), which includes Geometric Dimensioning and Tolerancing (**GD&T**) and Functional Tolerancing and Annotation (**FT&A**).
- Allows geometry use in CAD, CAM, and CAE applications. The geometry can be stored in either a tessellated or precise form.

Why is Adobe releasing PRC to ISO?

At this point in the development of PRC, it makes sense to extend its openness by working through a formal standards process. The PRC specification is currently published by Adobe, and its development as a formal standard will help extend its functionality for use within 3D documentation workflows. This release of PRC to ISO supports Adobe's commitment to open standards, and follows the release of PDF to ISO (ISO 32000).

How is PRC being used today?

PRC is currently used in 3D documentation workflows for several large industries, including aerospace, automotive, and architecture. The manufacturing industry has come to rely on PDF for the exchange of manufacturing documentation, distribution of service and parts manuals, and capture and submission of regulatory documentation.

The release of PRC to ISO is expected to accelerate innovation around PRC, drive even broader adoption of PRC, and will help ensure that PRC will evolve to meet the 3D documentation needs of product manufacturing and related industries.

What does this mean for the PDF ecosystem and companies that make PDF file creation tools?

It will open new opportunities because it will broaden adoption and acceptance of PRC, accelerate new solutions development, and ensure greater interoperability among PDF implementations for 3D-enabled workflows.

How soon will PRC become an ISO standard?

Adobe is releasing the full PRC specification to AIIM in December 2008 for the purpose of publication by ISO. Normal time frames for the development of an ISO standard range from 24-36 months.

What is AIIM?

AIIM is an ANSI (American National Standards Institute) accredited standards development organization. AIIM also holds the Secretariat for the ISO (International Standards Organization) committee focused on information management compliance issues, TC 171. TC 171 is the ISO committee that developed the existing ISO standards relating to PDF/A and PDF/E. Accordingly, AIIM is an authority that ANSI uses to submit proposed standards to ISO.

Is AIIM the only organization that will be working on the PRC standard with ISO?

AIIM is the international organization in liaison with ISO. However, ANSI, the member body of ISO, holds the Secretariats for ISO/TC 171 and ISO/TC 171/SC 2, which are administered by AIIM. Additionally, there is an established liaison between ISO TC 171/SC2 and ISO TC 184/SC4 (STEP) for this effort.

What is included in the release of PRC to ISO?

The submitted specification includes the complete Adobe PRC specification and the object data model. The ISO specification removes all specific product or company references and is formatted according to the ISO document template and styling rules.

How does PRC store 3D data?

A PRC file is a sequential binary file, written in a portable way. PRC files can be constructed to contain only a visual representation of a 3D model that consists of polygons, or it can be constructed to retain more accurate model geometry. PRC can be compressed to various levels during conversion to decrease file size.

Most of the main constructs of CAD system formats are supported by the PRC format:

- Assembly and part relationships among 3D entities
- Precise geometry representation (B-Rep)

- Tessellated (triangulated) representation of B-Rep geometry
- PMI (3D annotations)

PRC is meant to be multipurpose; lossless compression may be used to more accurately represent CAD data.

There are a number of 3D formats – why use PRC?

While there are a number of other 3D file formats, PRC integrates well with document formats such as PDF and XML.

Specifically, PRC supports:

1) *Structural and geometrical representation*

PRC has direct support for a wide variety of high order primitives that correspond to those used by CAD applications. This permits more of the original design intent of the file to be retained.

Compared to other 3D file formats, PRC retains far more information about the product structure and relationships defined in the original design application. Other 3D formats take a more general or display-oriented approach to product structure. This may make it harder or impossible to reconstruct aspects of the original design relationships needed to support “manufacturing from a file” or maintenance workflows.

2) *File size*

PRC captures meshes and compresses them far more efficiently than native CAD formats. Files containing both precise geometry and tessellated geometry can be significantly smaller when converted to PRC. This results in great benefits when transporting and storing the data, particularly over limited bandwidth or to wider groups of reviewers and consumers of this data. Even large 3D models can be easily shared over email.

3) *Product Manufacturing Information*

PRC can represent Product Manufacturing Information (PMI), which is used to primarily communicate the full design intent to suppliers and their shop floors. Without PMI embedded in the file format, OEMs are required to send many 2D drawings to their suppliers to communicate the full design intent. The use of PRC can reduce the need to create 2D drawings from 3D models for distribution to the supply chain.

How does PRC complement STEP?

As a lightweight visualization format, PRC complements and supports STEP, which is designed primarily for interoperability between CAx applications as well as for longer-term retention initiatives, such as LOTAR.

In combination, PRC and PDF can 3D-enable the following workflows:

- Designs visualization and collaboration
- Technical documentation
- Field service manuals
- Re-purpose of 3D content for print documentation

- Re-use of 3D content as a B-Rep in CAx packages
- LOTAR of a visualization format

Will PDF continue to include U3D?

Yes, U3D is the original 3D data format supported by PDF and thus is, and will always be, part of PDF. As U3D evolves, PDF will continue to support future versions.