Parts & Documents, Terms and Definitions

"If names be not correct, language is not in accordance with the truth of things."

(Confucius, 551 - 479 BC, see https://en.wikiquote.org/wiki/Confucius#Chapter_III)

Scope

This paper contains a glossary of terms which are used in the other papers published on www.joergei.de/cm incl. definitions and explanations as recommended by the author.
The terms and definitions in this paper apply especially to hardware configuration management. In particular, the terms revision, version and release are used differently in the software development.

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Glossary

1. Parts and documents

Part
A discrete object that may come into existence as a consequence of a manufacturing process. [6]

A part is a unique component, material, semi-finished product, assembly, final product, accessory or software, whether manufactured or bought.

This definition refers to the physical (!) items, i.e. physical parts as produced, bought, stored in a bin/on the shelf/in a warehouse, sold, shipped, repaired etc.

CAD part models and part records in databases are not parts but documents specifying parts, even the users of these systems often call them just "part".

Parts are identified by a part number.

Synonyms: Item, article, material (in SAP).

Part family
A collection of nearly identical parts differing in one or a few parameters only.

Document

A bundle of information or data which can be stored on a single medium for the purpose of passing it on.

> That means: A document in the sense of CM/PLM is a limited amount of information that can be identified and given to another person by storing it on a single medium.
> An electronic file is not a document but a document container, the container of the information. One document (the information) can be filed in several and different containers, e.g. several file types (pdf, docx ...), printed on paper etc.
> A document (the information) can have several language versions, stored again in several containers.
>
> Document examples are: Drawings, 3D models, specifications, reports, standards, invoices etc. nevertheless in which container and on which medium they are stored.

Multi-part drawing

A document specifying several similar parts differing in one or a few parameters only (i.e. part variants, parts of a part family).

> In a multi-part drawing, there is a part number table where the several parameters are allocated to different part or TAB numbers.
>
> Synonyms: Tabulated document, tabulated drawing (if TAB numbers are used)

2. Documents and parts identification, numbering

Ident number – ID

A number which is assigned to a numbering object in such a way that one numbering object is allocated to one ident number and one ident number refers to one numbering object, see [4].

Document ID

The unique combination of **Document Type + Document Number + Revision** clearly identifying a document.

> A document can be available in various language versions. If the document ID's are the same, the language versions must have the same content/the same information.
>
> If two documents have the same DocType and DocNumber and differ only as to revision, this is often called different revisions "of <u>one</u> document". If two documents differ as to DocType and/or DocNumber, the documents are always two independent documents which are to be revised separately.
>
> Due to a change a document may have two kinds of succeeding documents:
> a)   a new revision (the revision is counted upwards, DocNumber and DocType remain the same),
> b)   a new (different) document (new DocNumber and/or different DocType).
>
> For document types that are never revised the revision can be omitted when such a document is referred to, e.g. in the case of Engineering Change Requests (ECR), invoices, delivery notes etc.
>
> The document ID must be stated on the document, e.g. in the document header:

Format of part and document numbers			logo Muster
Muster GmbH Company Standard			GmbH
Document ID	Release date	Page	
WN 23010-5 Revision: **A**	**2018-08-30**	**1 of 5**	**Confidential**

Document type, DocType

A class of documents with similar contents.

The document types are subdivided mainly in terms of contents. Formal criteria such as file extension or similar are applied only in exceptional cases.

The DocType is a part of the document ID.

Document types should be abbreviated by a string of 2-3 capital letters, e.g.
DWG   = drawing
ECR   = engineering change request
INV   = invoice

Document number, DocNumber

The middle (numeric or alphanumeric) part of the document ID.

The document number range is pre-determined for each document type, i.e. some document types may have their own specific document number range, other document types can get a document number from a common document number range.

Sometimes it is useful to divide a document (the information) into several sub-documents. Sub-documents can get a suffix to a common document base number, e.g. 60345-1, 60345-2.

First issue of a document

The version of a document to which the combination of DocType and DocNumber has been assigned for the first time.

The first released version of the first issue is called "Initial revision".

Revision, Rev.

An alphanumeric attribute of a document to identify a released document version. The revision is increased if a previously released document is changed.

The revision is part of the document ID.

The revision is the counter of released document versions.
The author recommends to always allow only one released revision at a time.

The revision was and is often called change index, drawing index or index. In accordance with ISO 7200 [4] the term "change index" is permitted. Notwithstanding this the author recommends to solely use the term "revision" only. Why? „Change index" normally is seen as the counter of changes and leads to the bad practice of not assigning a revision indicator to the first issue of the document.

Document version

Each new review status of a document due to a change, independent of the document status.

A document version counter – if used – is increased at every modification of a document, e.g. every time a changed file is saved by the person working on it.

It is not obligatory to use and file different document versions. Some systems create a new version automatically when the file is saved and checked in again.

Caution: Don't mix up the document version with the SAP field „Doc.vers.". This field contains the revision!

File ID

A number or combination of attributes clearly identifying an electronic data file.

The file ID is equal to the filename or a part of the filename. Electronic data files in the sense of a document container are identified by a unique ID number or by the combination of
DocType + DocNumber + Revision + [Document version] + Language version + file extension + [file number if the document is divided up into several files].

If the file is to be identified by a "speaking" file name, all these attributes must appear in the file name. Details in square brackets are optional. A short title can be added.

When files are exported from the PDM for usage outside of the PDM, they automatically should get a file name at least like this:

> "DocType_DocNumber_**Rev**Revision_Language**.**ext"

e.g.
> "DWG_12345-01_**Rev**A_en**.**pdf"

Native CAD documents and software should be excluded and keep their original file name.

Drawing number

Document number of a drawing.

The drawing number is not the drawing ID! To identify a drawing there must be given the Document type (drawing) + Drawing number + Revision. The drawing header must contain all three attributes, e.g.

[drawing title]		
Doc Type	Document Number	Rev.
DWG	**12345-01**	**D**

Part number

A name or alphanumeric identifier, used to designate a part or assembly, of the same configuration, and to differentiate it from all other products. [6]

The part number is an ident number that clearly identifies a specific unique (physical) part, especially from the point of view of departments handle the physical parts, like manufacturing, service, shipping etc.

Parts have no revision. If it would be necessary to distinguish the parts by a "revision" when they are used this "revision" would be – per definition – a part of the part number.

Synonyms: Item number, article number, material (in SAP).

Part base number

The sequential numeric main/root number inside the part number.

This term is used only if the part number includes supplementary identifiers like generation number or TAB number or the like.

Example:
If the part number is **NNNNN-GG-TT** then **NNNNN** is the part base number.

Part generation number, Part generation

A supplementary identifier inside the part number representing the historical sequence of non-interchangeable parts, which have been developed from each other.

A part generation increased by +1 indicates that this is a part created by a non-interchangeable design change of the part with the same part base number and the previous part generation.

Example:
Let's say there is a part 12345-01 where 01 is the generation number. A dimension must be changed and the new part needs a new part number. The new part gets the number 12345-**02**.

Part generation numbers may be used if the people of a company want to see the history of non-interchangeable changes within the part number – maybe for historical or other reasons.

The part generation number – if used – forms an integral part of the part number. It is not a revision and must never be referred to as revision or part revision.

TAB number

A supplementary identifier inside the part number used for differentiating of similar part variants or parts of a part family.

Example:
Let's say there are 3 parts with colour options, dimensions and other specifications are the same. Using a TAB number, the part numbers of the parts may be:

a) in case of part numbers without generation number
12345-01 (green)
12345-02 (blue)
12345-03 (red),

b) in case of part numbers with separate generation number 01
12345-01-01 (green)
12345-01-02 (blue)
12345-01-03 (red).

The TAB number – if used – forms an integral part of the part number. It is not a revision and must never be referred to as revision or part revision.
The TAB number is sometimes also called "dash number".

Preliminary part number

Preliminary identification number assigned by the CAD designer to clearly identify a part model or a part before an "official" part number is assigned.

Using of preliminary part numbers is a waste of time, absolutely not necessary and should be avoided.

3. Interchangeability, kinds of changes

Interchangeable

Two or more items are considered interchangeable if, in all applications, they are:
1. of an acceptable form (appearance) to meet all esthetic requirements per the Product Specification,
2. of a proper fit to assemble with other mating items per the drawing dimensions and tolerances resp. software interface,
3. of a proper function to meet the Product Specifications including performance, safety and reliability requirements,
4. and if these three criteria are met both ways (old design in the new and vice versa) without different assembly, test or repair procedures for the item or related items. [1]

"The Product Specifications are used for form and function. The drawing dimensions and tolerances are used as the criteria for fit. This is a critical distinction … to avoid oversimplified rules like 'change of form/fit/function even a little bit'." [1]

Non-interchangeable

"Items which meet some, but not all of the above criteria are not completely interchangeable and are, therefore, considered non-interchangeable." [1]

Form/Fit/Function, FFF

Main criteria to define the interchangeability of parts.

> The term "form/fit/function" is often used as a synonym for "interchangeability". However, as there may be changes in form or function that do not affect the interchangeability and as there are other criteria, too, it is recommended to use the term "interchangeability" instead of "form/fit/function".
> More see *Item Interchangeability Rules* [7].

Downward compatibility

The item is able to replace previous versions, but not interchangeable.

Specification change

Change in terms of contents. Change in terms of the contents of the specifications contained in a document. For drawings: Changes affecting the physical and/or geometrical characteristics of the part(s) depicted.

Editorial change

Formal change of a document without affecting the contents of the specifications contained in the document. For drawings: Change of the drawing without affecting the physical and/or geo-metrical characteristics of the part(s) depicted.

> The term "Documentary change" should not be used as synonym for an editorial change. (Also specification changes are documentary changes/changes of the document.)

Non-interchangeable change

Specification change of a document specifying a part in such a way that the produced part gets a physical modification requiring a new part number according to the *Item Interchangeability Rules* [7].

Interchangeable change

Specification change of a document specifying a part in such a way that the produced part gets a physical modification not requiring a new part number according to the *Item Interchangeability Rules* [7].

4. Status definitions, release

Document status

Status referring to the usability of a document (release status). The document status is valid only for just a certain document with a unique document ID.

> The author recommends to define the following document statuses:
>
>> Not released
>> Not released, in review
>> Released
>> Released, under revision
>> Withdrawn
>> Canceled

The changes of document status permitted within the framework of a document ID, i.e. for a given revision, are illustrated in the figure 1 "Permitted Changes of the Document Status".
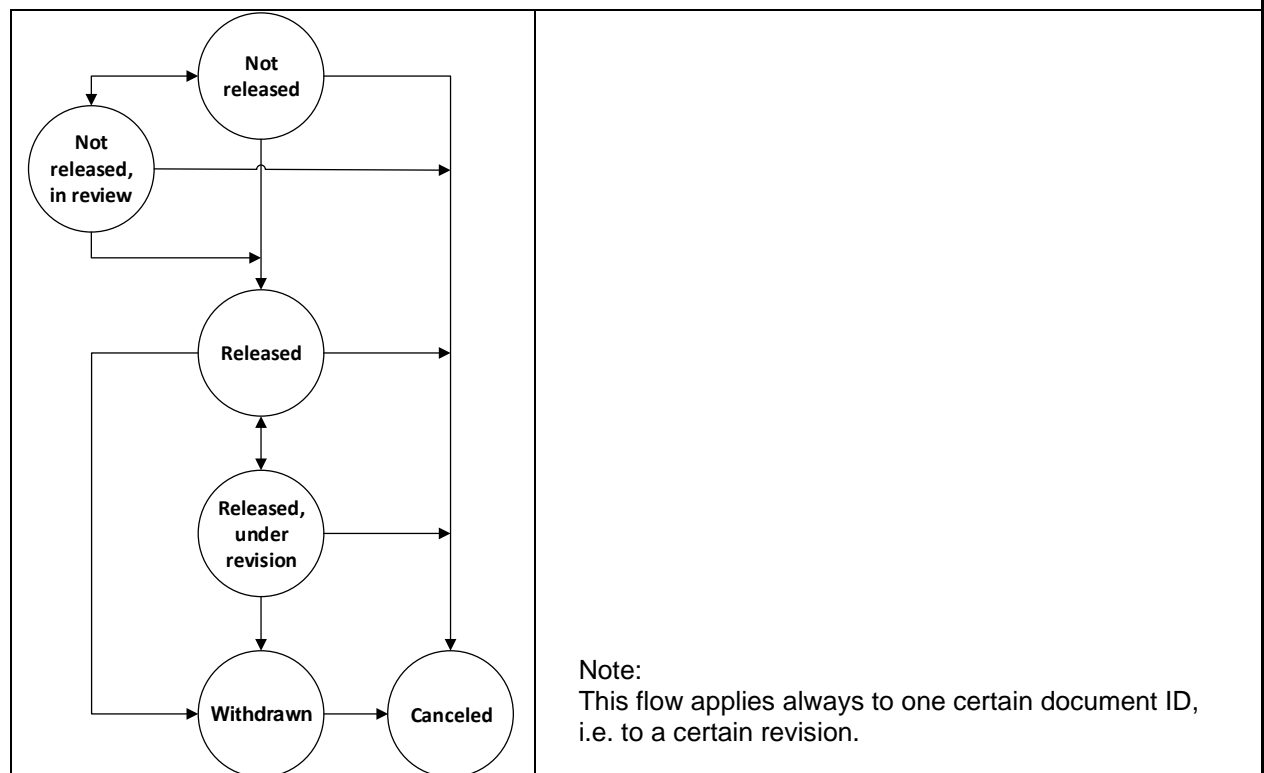
The document status is stored in its own database field of the document management system. Always refer to the respective leading document management system to view the currently valid status of a document. Hard copies (print-outs), file copies stored on other directories and files sent by email are always considered an "uncontrolled copy".

The document status must not be indicated on the document. This applies especially to the statuses "Released" und "Released, under revision". If the user gets a document marked with a document status so this does not necessarily mean that the document is still in that status.

The document status must not be coded into the revision indicator.

Note: The document status defines the usability not the actual or planned usage of a document in a certain product. Whether a released document can be used for a product depends on the fact whether it forms part of the product structure/configuration baseline. That means for drawings: whether the related part is listed in the Bill of Materials. The usability (document status) is a characteristic of the document. The usage is a characteristic of the product structure/configuration baseline.
In case of general documents – such as company standards – each document lists its own specific application area.

Figure 1: Permitted Changes of the Document Status

Note:
This flow applies always to one certain document ID, i.e. to a certain revision.

Not released

Document status which indicates that the document has not (yet) been released for use, not even for restricted use.

A document, that means a certain document revision, keeps its status "not released" as long as the author is working on it and/or as long as it has not been reviewed. Dependent on the document type a review by the author or one or several persons may be required before releasing it. In case of document processing using the full workflow functionality of the PDM system the status „Not released, in review" should be used for the review phase.

Not released, in review

Temporary document status with the same characteristics as the status „Not released". It additionally indicates that the author has finished the creation of the document and that the document is now reviewed by another person.

> After the review the reviewer can either release the document (set status to „Released") or reject it to the author (set status back to „Not released").

Released

Document status which indicates that the document has been released for use. This includes restricted use, e. g. the use limited to prototype manufacturing.

> If the document itself defines an application area, the usability is restricted to this area of application.

> A document revision that once had got the status „Released" cannot be changed any more and can only be set to status "Released, under revision", "Withdrawn" or „Canceled".

> As soon as a document is passed on by the author or reviewer to make use of it in any way, its status automatically becomes „Released".

> The released status must not depend on the maturity status of the document. The author recommends not to use such statuses like "pre-release" or similar.

Released, under revision

Temporary document status with the same characteristics as the status „Released". In addition it indicates that a new revision or a succeeding document is being worked on.

> A document revision which once had got the status "Released, under revision" cannot be changed any more. It can only be set back to status „Released" or set to "Withdrawn" or „Canceled".

> This status should be assigned to a document only if an appropriate change request (ECR) has been issued, and if the ECR has been recommended for further processing by the author of the document and the change administration.

> The document is set back to the status „Released" if
> a)   the change request has not been approved   or
> b)   if, due to the change request, a new document (first issue with a new DocNumber) is issued and the old revision is to remain „Released".

Withdrawn

Document status which indicates that the document has been withdrawn. Documents in the status "Withdrawn" may be used only for processes, orders, actions that were started when the document was still „Released".

> A withdrawn document normally is replaced by a succeeding released document. New processes, orders, actions must refer to the succeeding document.

> It is permitted and unavoidable in practice that, e.g. the incoming inspection and the manufacturing still base on the older revision of a drawing ("Withdrawn") whereas the R&D department has already issued a new „Released" succeeding document.

> Documents in the status "Withdrawn" can remain in that status even if they are no longer used. It is not necessary to change their status to „Canceled".

Canceled

Document status which indicates that the document has been blocked for any use.

This status is used in particular to block the use of a document immediately if its use might result in faults. It can be reached from each other document status.

Uncontrolled copy

Container of a document which is not subject to revision control, i.e. which is not necessarily replaced when a new revision of the document is released.

The author recommends to define each hardcopy of a document as an "uncontrolled copy". Headers or footers of documents should therefore include the following note: "A print of this document is considered an uncontrolled copy."

The configuration control of documents takes place solely in the document management systems, e.g. PDM.

"Uncontrolled copy" is not a document status.

Releasing a document

Providing or passing on a document for use.

A document is considered released just by providing or passing it on to someone for use/for application, regardless of whether it is marked „Released" or not.

The review of a not released yet document is not considered a form of use or application.

Literature

[1] **Watts, Frank B.: Engineering Documentation Control Handbook – Configuration Management for Industry**, William Andrew Publishing, LLC; ISBN: 0815514468; 2nd edition; Norwich/New York/USA 2000

[2] **MIL-STD-100G:** Engineering Drawings

[3] **ISO 7200:** Technical product documentation – Data fields in title blocks and document headers

[4] **DIN 6763:** Numbering – Basic terms and definitions

[5] **ISO 10007:** Quality management – Guidelines for configuration management

[6] **OASIS PLCS Technical Committee Dictionary of Terms**
http://www.plcs.org/plcslib/plcslib/sys/plcslib_terms_base.html as per 2019-07-25

[7] **Eisenträger, Jörg: Item Interchangeability Rules**, published on https://www.joergei.de/cm/

Revision history of this document

Rev.	Released on	Author	Modifications
A	2004-07-02	Jörg Eisenträger	Initial revision
B	2019-08-09	Jörg Eisenträger	Fundamentally revised.
C	2019-12-12	Jörg Eisenträger	Numerous definitions and explanations more precisely formulated.
D	2020-06-28	Jörg Eisenträger	German translation of term "Non-interchangeable" corrected. (This applies only to the German version of this revision.)