FUSION FOR ENERGY

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F4E Document

F4E_CAD_Manual

This document describes the procedures, processes and the expected CAD environment for suppliers carrying out CAD design work for mechanical and plant systems.

Approval Process			
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Change Log			
F4E_CAD_Manual (22BE49)			
Version	***Latest Status***	***Issue Date***	***Description of Change***
v1.0	Signed	07 May 2010	
v2.0	Signed	05 October 2010	New section on the schema of design collaboration and numbering system were added.
v3.0	In Work	07 October 2010	Updating version in IDM with document version
v4.0	In Work	07 October 2010	Updating IDM version with document version
v5.0	In Work	07 October 2010	Updating IDM version with document version
v6.0	In Work	07 October 2010	Updating IDM version to the document version
v7.0	Approved	07 October 2010	Modifications introduced in the sections related to scheme of collaboration and numbering system. The IDM revision is the same as the document revision
v8.0	Approved	10 June 2011	The section of the Executive Summary modified in this version are: 1.- Section 2.3.1 , 2.4.1 and 2.6.1 Properties and attributes definition 2.- Section 2.5 Standard parts CADENAS 3.- Section 3.1.4 Scheme of design collaboration. Synchronous approach 4.- Section 3.1.7. Drawing Title Block 5.- Section 3.2.1 CAD Data Workflow and life cycle in asynchronous mode 6.- Section 3.2.2 CAD Data Workflow and life cycle in synchronous mode The main reason of the changes are due to the new customization of the ITER CAD Supplier Package that make possible to use the logbook, the integration of some request done by the suppliers. and the new IO title block policy.

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Major Changes

Version	Date	Location	What
1.0	20-02-2009	Barcelona	Draft release version
2.0	12-03-2009	Barcelona	2nd Draft release
3.0	08-06-2009	Barcelona	3rd Draft Issue
4.0	10-11-2009	Barcelona	4th Draft Issue
5.0	15-04-2010	Barcelona	5th Draft Issue
6.0	26-04-2010	Barcelona	6th Draft Issue
7.0	05-10-2010	Barcelona	7th Draft Issue
8.0	10-06-2011	Barcelona	8th Draft Issue

Table of Contents

F4E CAD Environment

Section 1
Introduction and Software Framework

1. Section 1. Introduction and Software Framework

This document shall be used by European industry, services, Institutions and Laboratories (Suppliers).
This is written in conjunction with the ITER IO CAD manual and has been modified to suit F4E requirements
The purpose of the this document is to describe the procedures, processes and the expected CAD environment for suppliers carrying out design work for mechanical and plant systems

1.1 SECTIONS CONTAINED WITHIN THIS MANUAL

Section 01 – Introduction and Software Framework
Section 02 – Design Processes
Section 03 – Collaboration Processes

1.1.1 Reference Documents

This document is to be used in conjunction with the ITER CAD manual
Hyperlinks to CAD Manual, How To, What Is & avi (ITER_D_24N3GT v1.32)

1.2 F4E Design Office

The F4E Design Office is responsible for providing the mechanical definition of components and systems in order to sub contract their manufacturing, in compliance with functional, technical specifications and QA requirements.

The main activities are:

i. To control the mechanical design or to manage, and occasionally perform, mechanical design in the particular cases of Functional specification Procurement Arrangements
ii. To manage IO CAD data : exchange, quality control and archiving
iii. To manage the CAD data exchange with F4E suppliers
iv. To carry out a localized F4E Mechanical Configuration control
v. To implement and maintain CAD and Product Life cycle management tools

vi. To identify, develop and manage the proficiency capacities of the team in these domains

1.3 F4E CAD Environment

The scope of the present document is to define the specific requirements for F4E. It is in accordance with the ITER CAD Manual and is written for the following F4E contributors:

i. The F4E Management, Quality Assurance, Project Office, Design Office Integration and Responsible Officers.
ii. The F4E Suppliers.

1.4 F4E CAD and other Software

1.4.1 F4E CAD Software Currently Installed

The F4E DO is equipped with the following software:

i. CAD system - CATIA V5 (Mechanical + Equipment & Systems modules) release given in the ITER CAD Manual section 7.1
ii. CAD system Autocad civil 3D 2009

1.4.2 Other Software to be used by F4E DO

a. CAD quality checker Q-Checker including the IO profile
b. 3D data Tolerancing (such as 3DCS) when available
c. Mechanical & Plant design catalogues. CADENAS library for mechanical components. For Plant design the ITER CAD Supplier Package EnS must be installed to have access to the Plant design catalogues.
d. Assembly and maintenance simulation system – DELMIA
e. Diagrams and schematics (PFD and P&ID and electrical circuit diagrams) will be created using IGE-XAO See System modules.
f. ISOGEN will be used to generate an isometric view from a system.

1.4.3 Engineering related data production & management software:

a. F4E PLM database (This will be used to store all CAD and other technical data plus the exchange of data between the Suppliers DO and F4E DO)
b. Analysis codes, Ansys, LS DYNA, civil FEM, Fluent,
c. Time management (PRIMAVERA & MS Project)

d. MS Office.

1.4.4 CAD Software to be used by suppliers

Suppliers are recommended to use the F4E main CAD system and other Software indicated above. If this is not possible, other equivalent CAD systems will be considered but suppliers must have F4E approval first before using any other Software.
Access to F4E PLM database, will be given to Suppliers when it is available. Until that time all activities for filling in title Blocks and model & drawing numbering etc. will be carried out manually see the F4E CAD Manual Section 3 Collaboration Processes.

1.5 F4E Collaboration schemes

The F4E design is developed in a delocalized manner. To ensure the efficiency of the design work as well as the coherence of the data requires the definition of collaboration schemes that have to be fully integrated in the procurement specification.

1.6 F4E Training Aids

ITER IO has developed training aids aimed at assisting a new, in-experienced or experienced user with various guides and instructions in understanding and using the various tools and methodologies used. F4E can provide this specific information from ITER_D_24N3GT - Hyperlinks to CAD Manual - Training Docs - How To - Catalogs - What Is - avi
The following different types of training aids are used and available

i. **How to**. These graphic aids use a PowerPoint presentation to explain the topic in a step by step fashion using text and screenshots. These presentations can be printed for easy reference whilst performing the operations on a computer.

ii. **What is**. These documents explain in simple terms various topics.

iii. **Video**. These video aids use an avi movie with a worked example. They allow the user to follow a process or methodology in real-time or in a stop-replay fashion. They also have an audio track, explaining the various steps involved in the process.

iv. **Whitepaper**. These documents explain processes and topics not suitable for a “How to”.

F4E CAD Manual

Section 2
Design Processes

2. Section 2. Design Processes. Introduction

The scope of this section is to define the criteria and rules to be applied to the CATIA V5 models and drawings. In this section will be defined the structure of the model, the methodologies to be applied and the naming convention.

These rules and criteria have to be followed in order to approve and integrate models and drawings into the ITER project database. When the F4E PLM system is available some rules and criteria will be added to this document.

For a F4E supplier to work in an ITER environment and reconcile its work correctly in the ITER environment, the ITER CAD Supplier Package has to be installed. The ITER CAD Supplier Package is a file that once installed defines all the ITER CATSettings and installs some macros that are mandatory to use if the information has to be exchanged with ITER via F4E.

Inside the ITER_CAD_Supplier_Package there is a file called DocSupplierPKG_V410 this file explains the contents and what to do to install everything.

These ITER hyperlinks explain the way to install and how to get the supplier package:

01_ITER_CAD_Supplier_Package_Readme_First_AVI (2W96C3)

01_ITER_CAD_Supplier_Package_Readme_First_PDF (2VUWWP)

The suppliers and associations who have to develop some plant design work using CATIA E&S modules have to install a specific ITER CAD Supplier package. The suppliers can download the instructions to install this package from the link:

ITER_D_34LRPA - 03 IO Collaboration Team procedure for EnS Add-on registery

When an update to the ITER CAD Supplier Package occurs the suppliers and associations will be informed by the Head of the F4E Design Office.

2.1 Naming convention

The part number and filename have to follow the rules defined in the quality document: "F4E-QA-112. Naming Convention".

The official language of the ITER project is English.

Care must be used in the correct spelling of a part name, as a spelling mistake will cause difficulties in searching for the part by its name:

A. The language used by ITER is English. The naming and spelling used should comply with this rule. Rule REW01.
B. The part name used should clearly and concisely describe the part.
C. Part names are limited to 35 characters (Description in the ITER Properties Panel).
D. The first preference for the naming of objects in CATIA and ENOVIA is to use the full names – full words and no abbreviations.
E. The second preference for the naming of objects in CATIA and ENOVIA is to use a combination of full words and abbreviations.
F. Only abbreviations included in the ITER abbreviations list are permitted. Rule REW02. For the current list see DO Abbreviations (ITER_D_24844F - DO Abbreviations)
G. A request for a new abbreviation should be submitted to the ITER CAD Manual and Processes Coordinator (CMPC) for consideration via F4E. If the suggestion is suitable it will be included in the ITER List of Abbreviations.
H. All part design bodies and open bodies must have speaking names. Rule RCP02.
I. The important geometrical elements and features should have speaking names. Rule RCP02.

2.2 Writing rules

The characters used must be compatible with all computer operating systems e.g. Windows, UNIX, Linux and Mac. With this in mind the following rules must be followed.

The following characters ONLY are permitted to be used:

i. Lower case letters are permitted only when used to express a chemical symbol. Example: He - Helium, Cu - Copper.
ii. Inside a CATIA CATPart, the bodies and elements can use upper and lower case letters.
iii. Numbers 0 to 9.
iv. Dot.
v. Equal =
vi. Minus sign -
vii. Plus sign +
viii. Underscore _
ix. It is not permitted to use national accented characters or characters other then the Roman alphabet. (E.g. Cyrillic, Kanji, Hangul etc).
x. The part or object name must start with a letter.
xi. An underscore '_' must be used to separate individual words or abbreviations. A blank space is not permitted. Inside a CATIA CATPart, the bodies and elements can use a blank space.

2.3 Design guidelines CATPart. 3D Model. Multipart/multibody

A CATIA model CATPart will contain a single 3D model (1 volume), of a single part, defined in a single body (PartBody). The model will contain the 3D part definition considering its nominal dimensions at Room Temperature (RT)

The RT for all modelling at ITER is 20°C (293K).
When modelling is carried out at any other temperature, example: Operating Temperature (OT), Bake-out Temperature (BT) etc, it shall be clearly identified

When a new model has to be created the CATIA function FILE + NEW will be used, after the creation the ITER Properties macro has to be applied as is described in the following section 2.3.1.

The design methodology preferred in F4E is the multipart approach instead of the multibody approach, because the multipart approach is more appropriate for the manufacturing phase.

The filename has to comply with the quality document "F4E-QA-112 Naming Convention" and the filename has to be identical to the part number.

2.3.1 Properties and attributes definition

In order to reintegrate a CATPart model in the ITER ENOVIA database some properties and attributes have to be defined. These properties and attributes have to be defined using the macro "ITER_properties", this macro is included in the ITER_Cad_Supplier_Package. Once you execute the macro, a window (Figure 1) appears. The following attributes have to be defined in this window:

- Description Reference. It is the part name; it has to be included in the part number and in the filename. The maximum length for this field is 35 characters.
- PBS 1, PBS 2 and PBS 3, must correspond to the first three levels of the Plant Breakdown Structure.
- RO. The ITER Responsible Officer.
- Change Type. It will be ‘minor change’ if the change doesn’t affect any interface or it is not a conceptual change, otherwise will be defined as a ‘major change’.

- External Part ID. It is the F4E part number; see the document "F4E-QA-112. Naming Convention".

After installing the revision of the ITER CAD Supplier Package 4.3.3 some attributes are compulsory to be filled in. All these new attributes are related to the design logbook. The purpose of the design logbook is to trace all the actions that are performed on a reference that can be a part, an assembly or a drawing.

These new attributes are:

1. Description of Modification, it should contain a brief description of the modification like a title of the modification.
2. Description documents link field that can be filled with IDM reference to any document that could be useful to explain the modifications that have been done.
3. Bill of Material field can be filled in the case of assemblies with IDM reference to the BOM related to it.

In the link you will find below you can open the IO How to use design logbook.

ITER_D_3QFDA9 - How to use design logbook

The way to use the design logbook has to be agreed between F4E and supplier/associations during the design process. The design logbook can be applied at the work package level or the part/product level.

There are some attributes defined in the Document tab of the same window as you can see in the Figure 2, the compulsory attributes are:

1. Description Long. It is the part name (Description Reference) without abbreviations.
2. RO. It is the name of the ITER Responsible Officer

The others attributes will be defined once the data is reintegrated in ENOVIA.

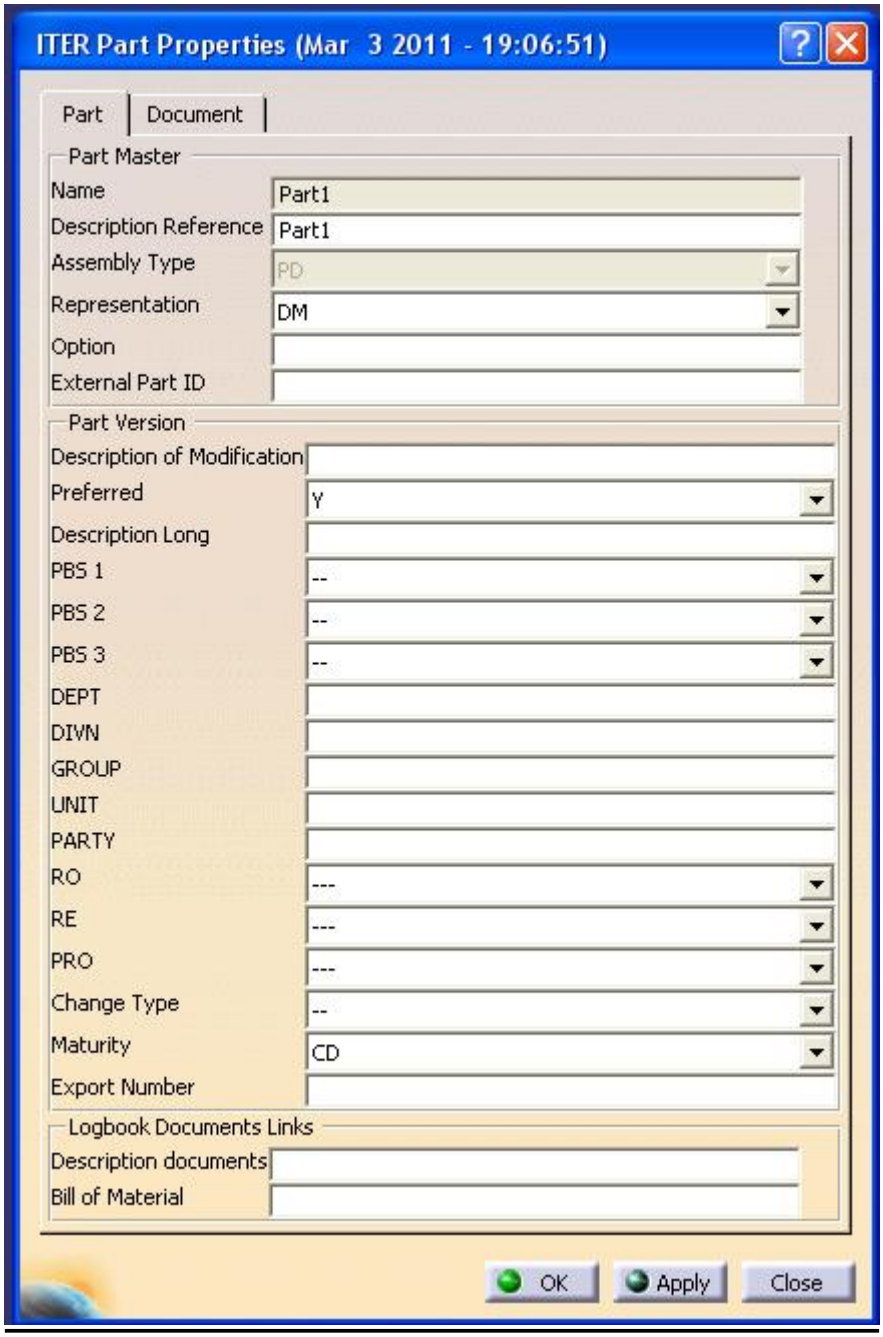


Figure 1.-ITER Properties window Part Tab

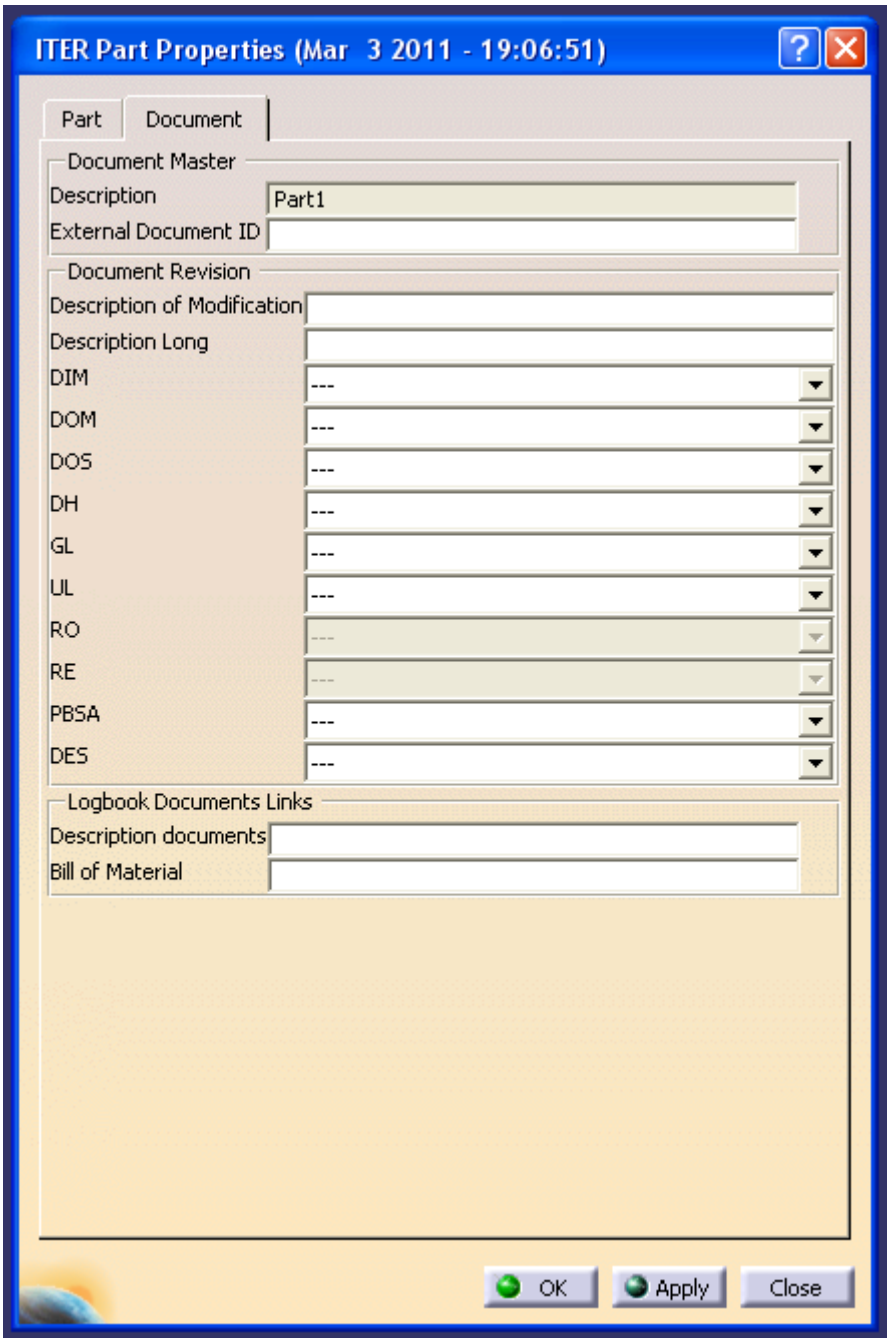
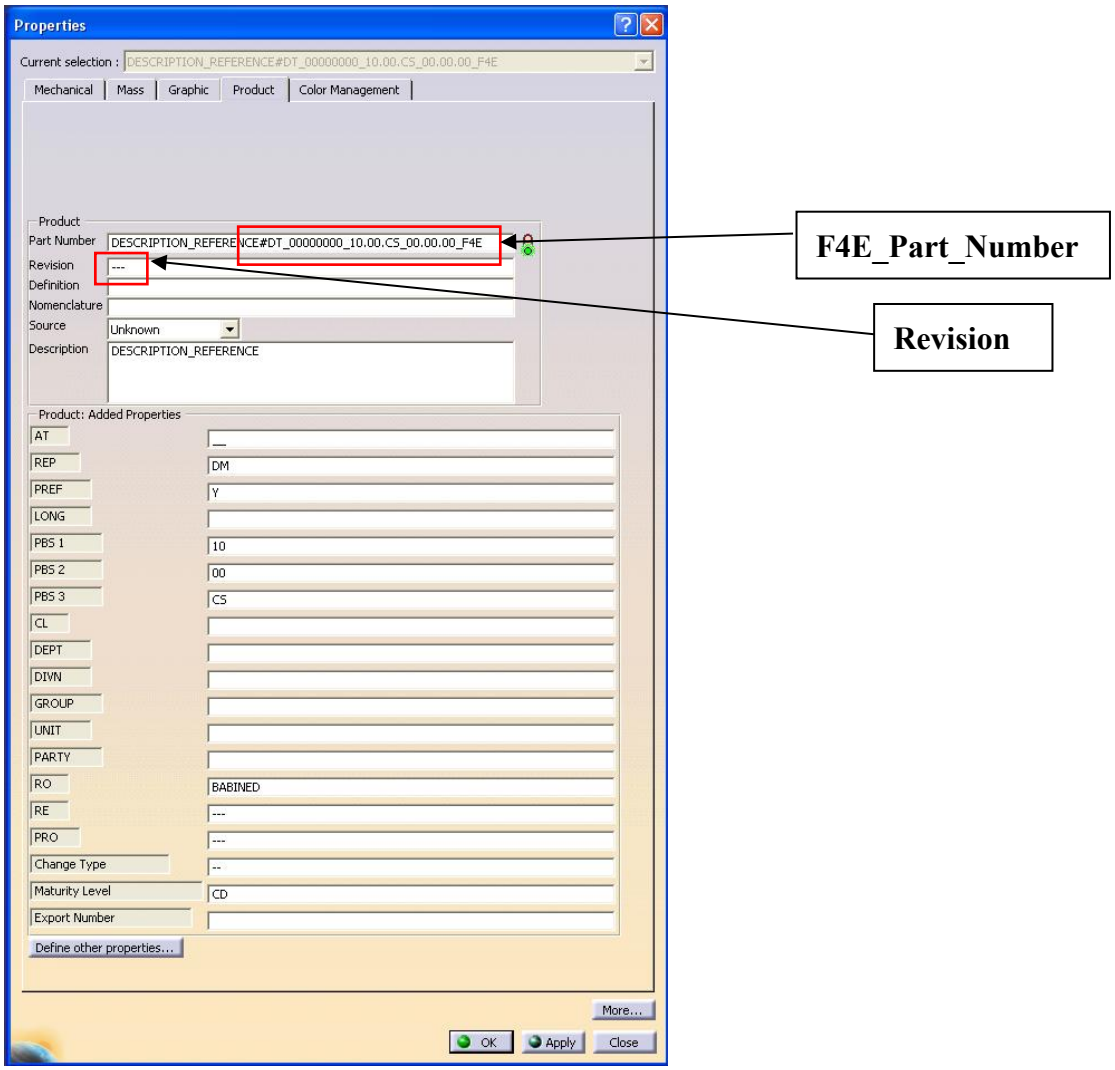


Figure 2.-ITER Properties window Document Tab

After applying the ITER properties macro, some CATIA properties have to be added, in the default CATIA properties, as shown in the following figure.



Some customized CATIA properties can be defined by the supplier using the CATIA properties window. Once the Modify ITER Properties macro has been applied the button “Define other properties …” will be available as you can see in the image below.

The only requirement to define a supplier's property is that the property must start with the prefix "F4E_..." as example: F4E_Revision.

2.3.2 Guidelines for parametric design

CATIA V5 is a CAD tool which allows a parametric design; this makes it easier to introduce modifications once the design is finished. At the beginning of the design process the basic elements of the design have to be defined, these elements can be linked to other models or to Skeleton models.

When an element has to be used in another model through a link, the element must first be published, the only kind of link allowed is the CCP links, the contextual links are forbidden.

An order of preference in the use of the elements as the basic elements of design can be established. The order of preference is as follows:

Basic planes: XY, XZ and YZ.
Explicit elements, they have to be selected from the specification three. (see Figure 3).
BREP face, this is a face that belongs to a solid, this can be selected on the screen.(see Figure 4).
BREP edge, this is an edge belonging to a solid, this has to be selected on the screen.
BREP vertex, this is a vertex belonging to a solid, this has to be selected on the screen.
BREP edge or vertex of a fillet or draft operation (see Figures 5 and 6).

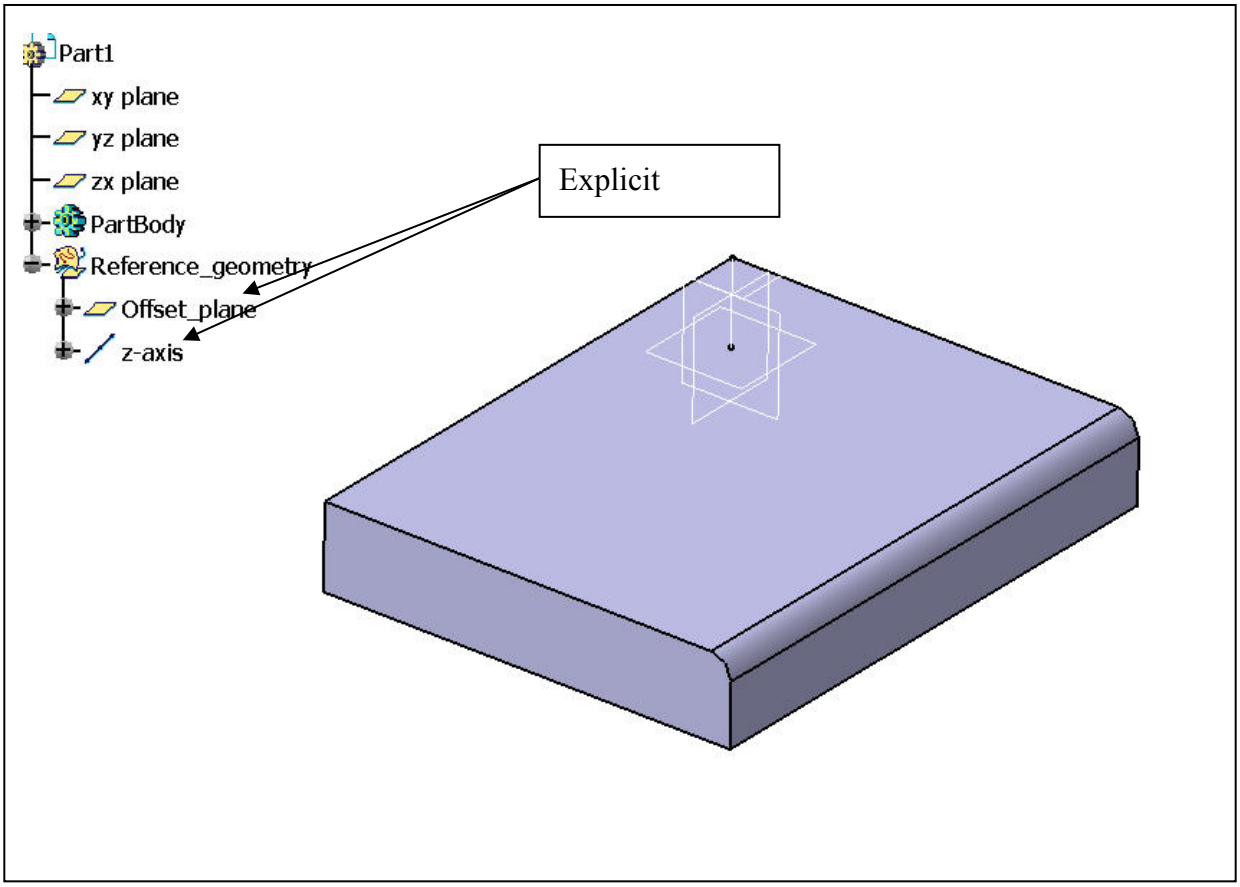


Figure 3.-Example of explicit elements

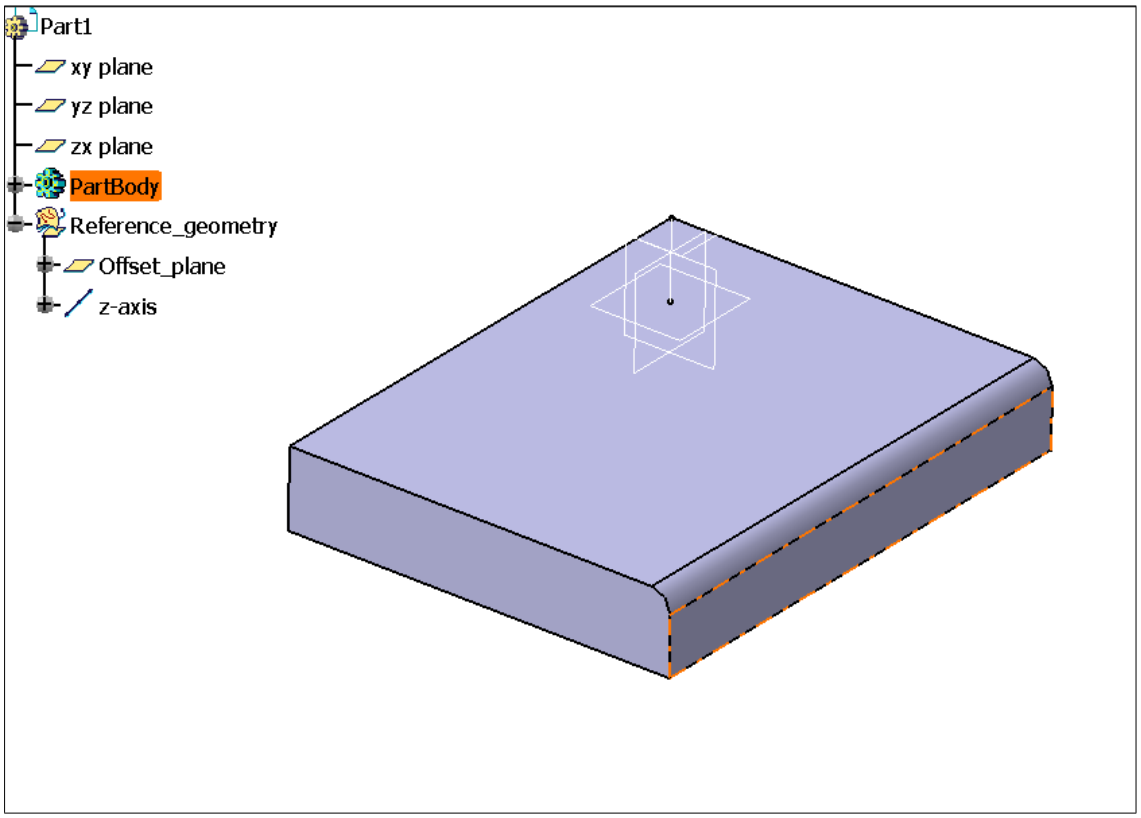


Figure 4.-Example of a BREP element face

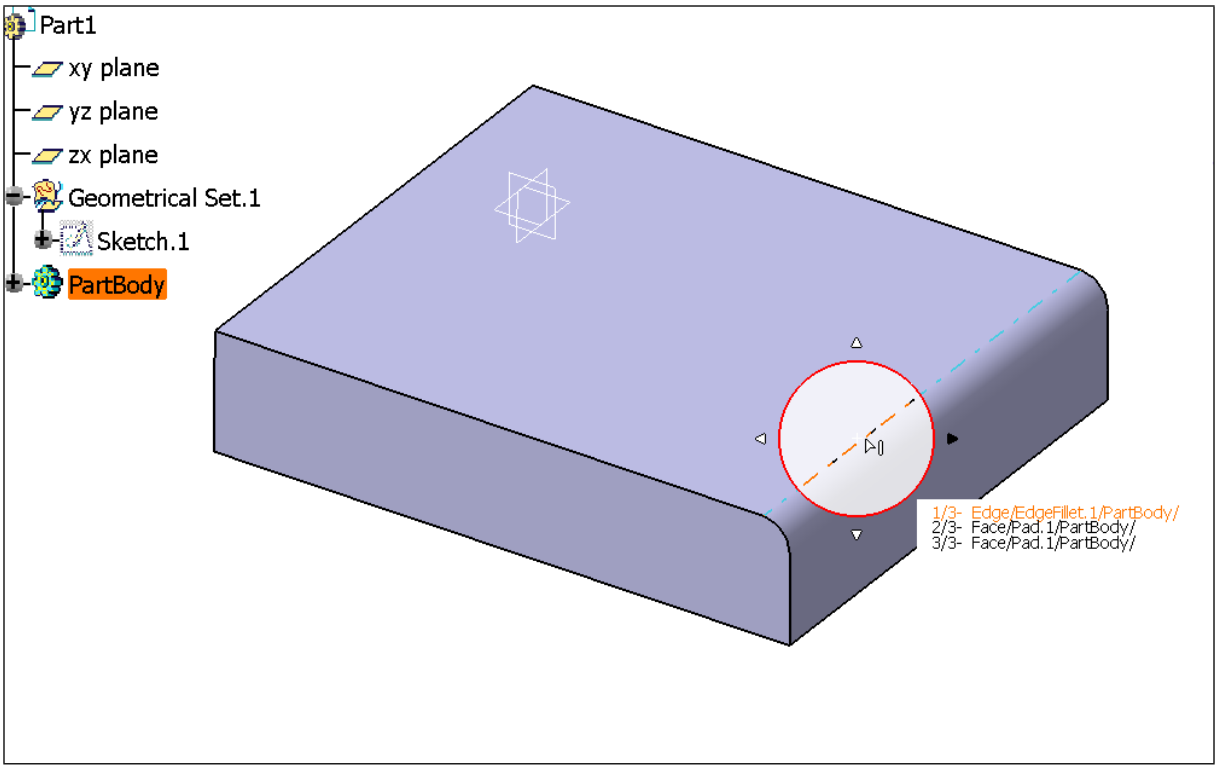


Figure 5.-Example of a BREP element – edge of a fillet or draft

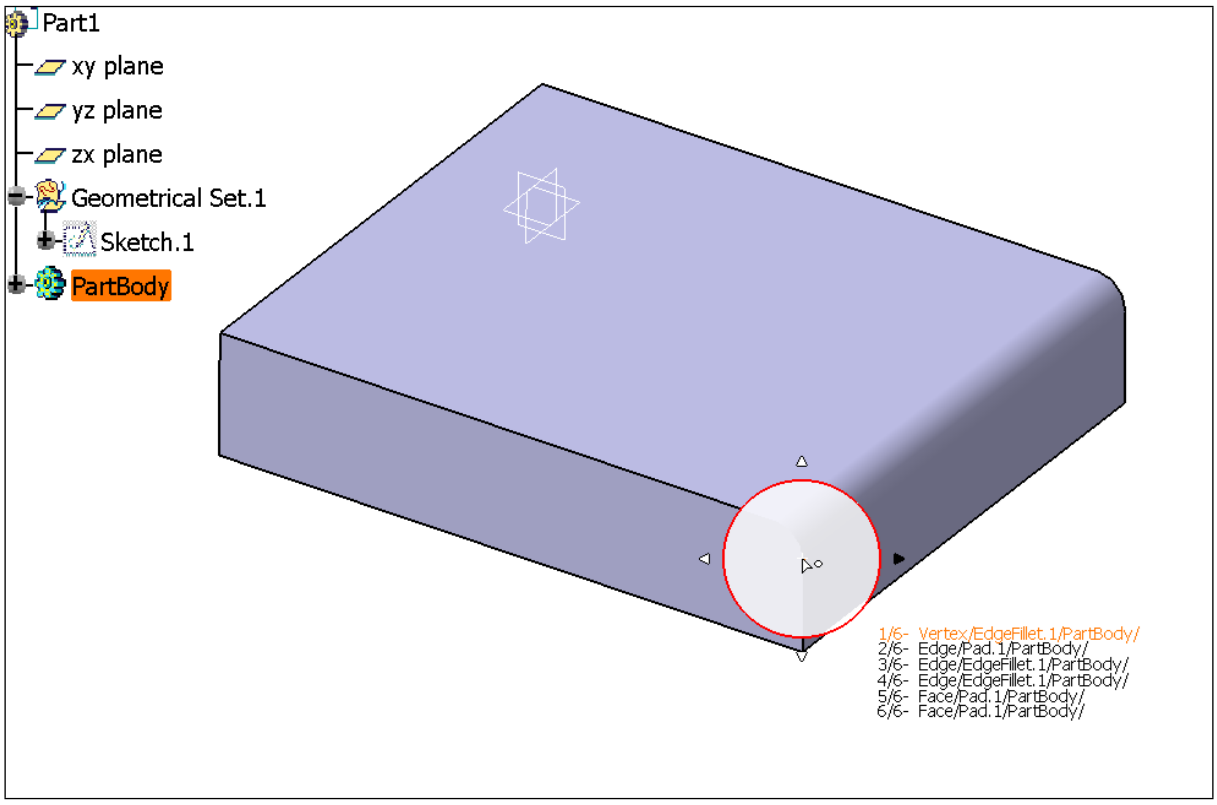


Figure 6.-Example of a BREP element – vertex of an edge of a fillet or draft

2.3.3 Sketches (2D)

The Sketches are recommended to be created from a plane instead of faces belonging to a solid, for the following reasons:

A. It is easier to understand.
B. It is more stable in case of updates.

The positioned sketch is the preferred methodology for the following reasons:

A. You have more control
B. You can define the origin of the sketch
C. You build more stable links
D. You avoid a flip of direction of the offset constraints which can occur in some cases after an update.

Figure 7.- The Sketch Icon

Figure 8.- The Positioned Sketch Icon

The geometry inside a sketch should be fully constrained (green). Otherwise the geometry is not fully controlled and you can get unpredictable results.

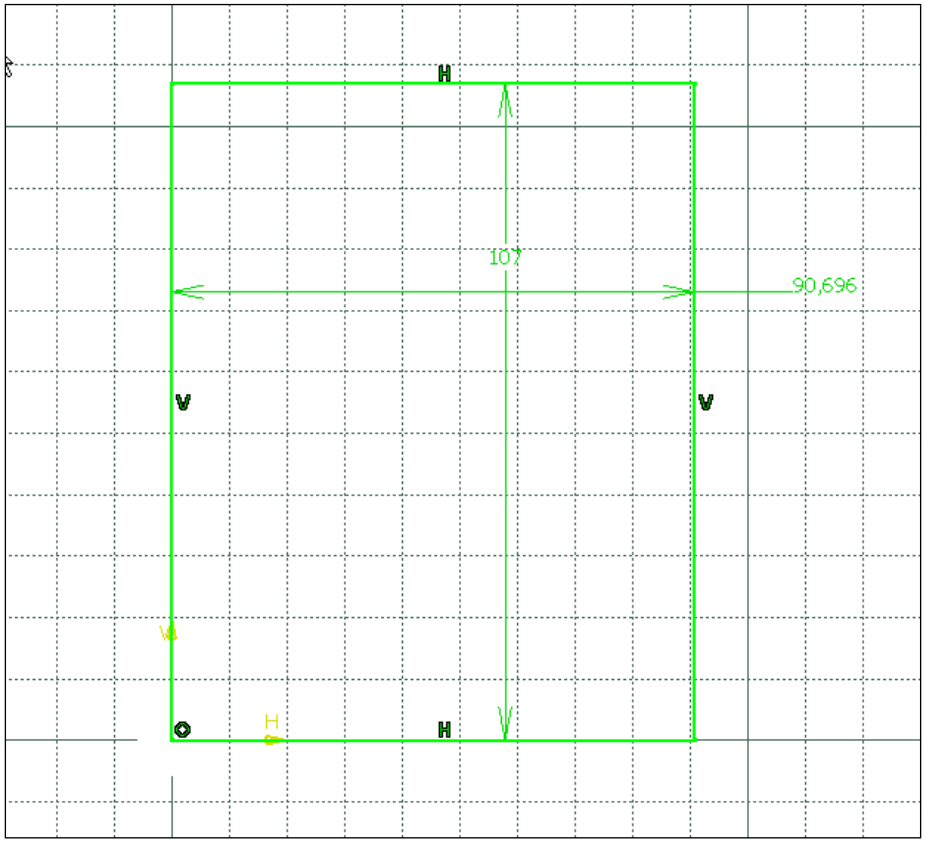


Figure 9.- Example of a fully constrained sketch

Use sketch analysis to detect any errors.

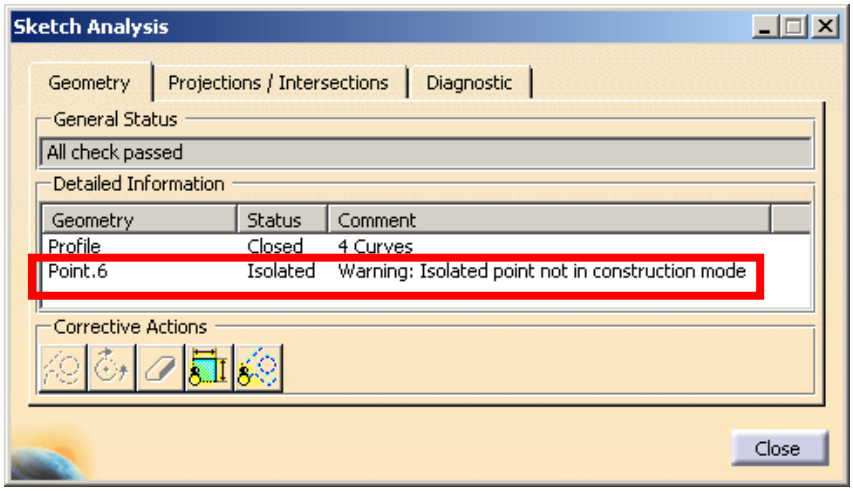


Figure 10.- Sketch analysis isolated elements

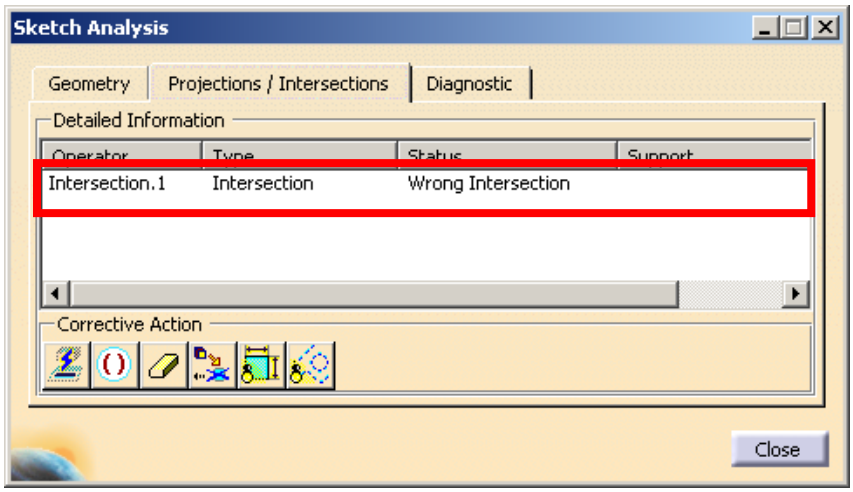


Figure 11.- Sketch analysis Projection/Intersection error

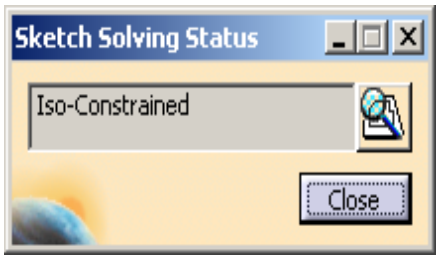


Figure 12.- Sketch analysis Solving Status

As references for constraints use elements with high stability. Avoid using edges or vertices.

If possible do not use 3D projection and intersection – in case of errors it is not easy to correct them.

Keep the geometry in every sketch as simple as possible.

Do not integrate holes, chamfers and fillets in the sketch profile. Make this geometry with the dedicated part design features.

2.3.4 Partbody (Solids)

As a consequence of the multipart approach, each CATPart has to contain only one body that defines the final part.

The part body can be used and should not be empty.
It is forbidden to use Multipad.

Figure 13.- The Multipad icon

Simple geometry up to about 20 features can be built with a linear structure in a single body.

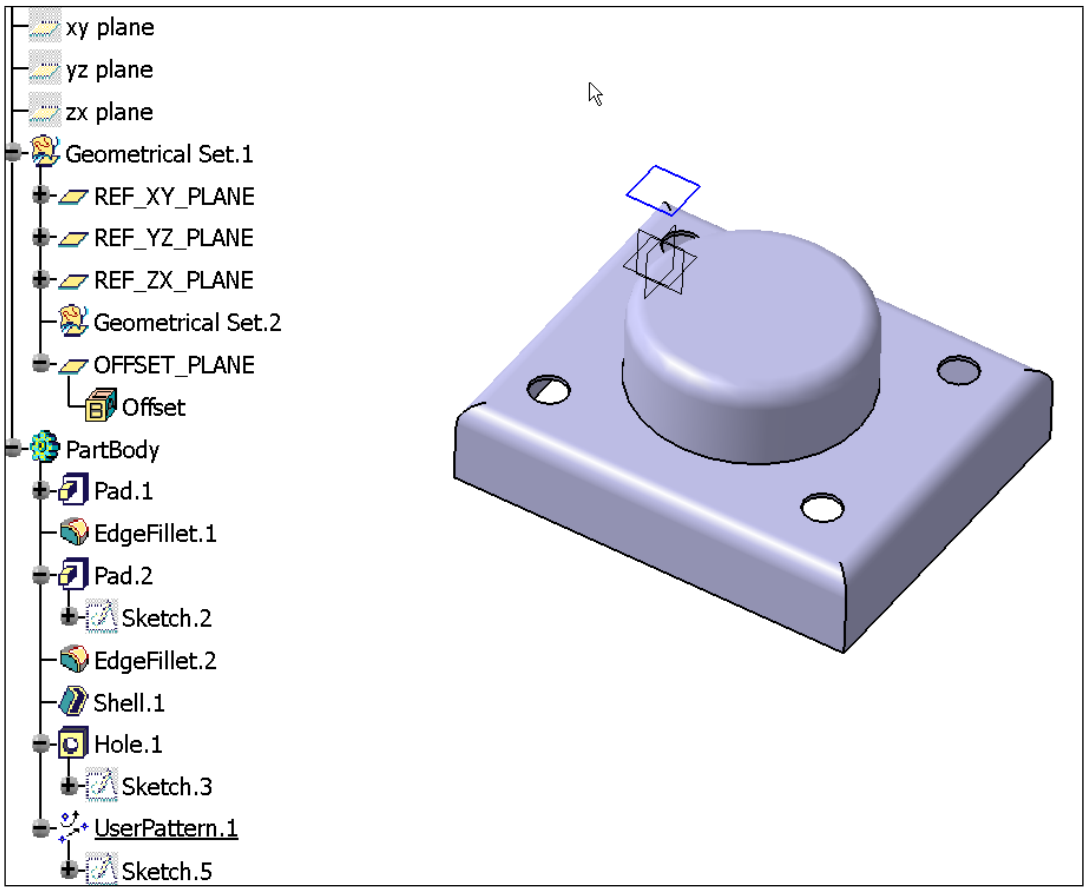


Figure 14.- Example of simple geometry with a linear tree structure

More complex geometry should be composed of several bodies which are linked by Boolean operations. The preferred option is ASSEMBLE. Otherwise the time taken to perform an update will increase proportionally. The recommended body structure should be function oriented, for example:

- outer shape
- inner shape
- Manufacturing steps etc.

Overlapping geometry make updates faster and avoids errors.

Create drafts first then fillets.

Make fillets starting from the larger radius values to the smaller values.

Fillets edges with the same radius can be performed in one operation.
The maximum number of edges per fillet feature should not be higher than 10 - in very special cases up to 20.

Dependent features like drafts and fillets should be ordered directly after the corresponding feature like PAD, SHAFT etc. Positioning them at the end of the structure tree leads to a longer update time. It is also possible to reorder those features or to insert them correctly by selecting the corresponding feature using MB3 “define in work object”

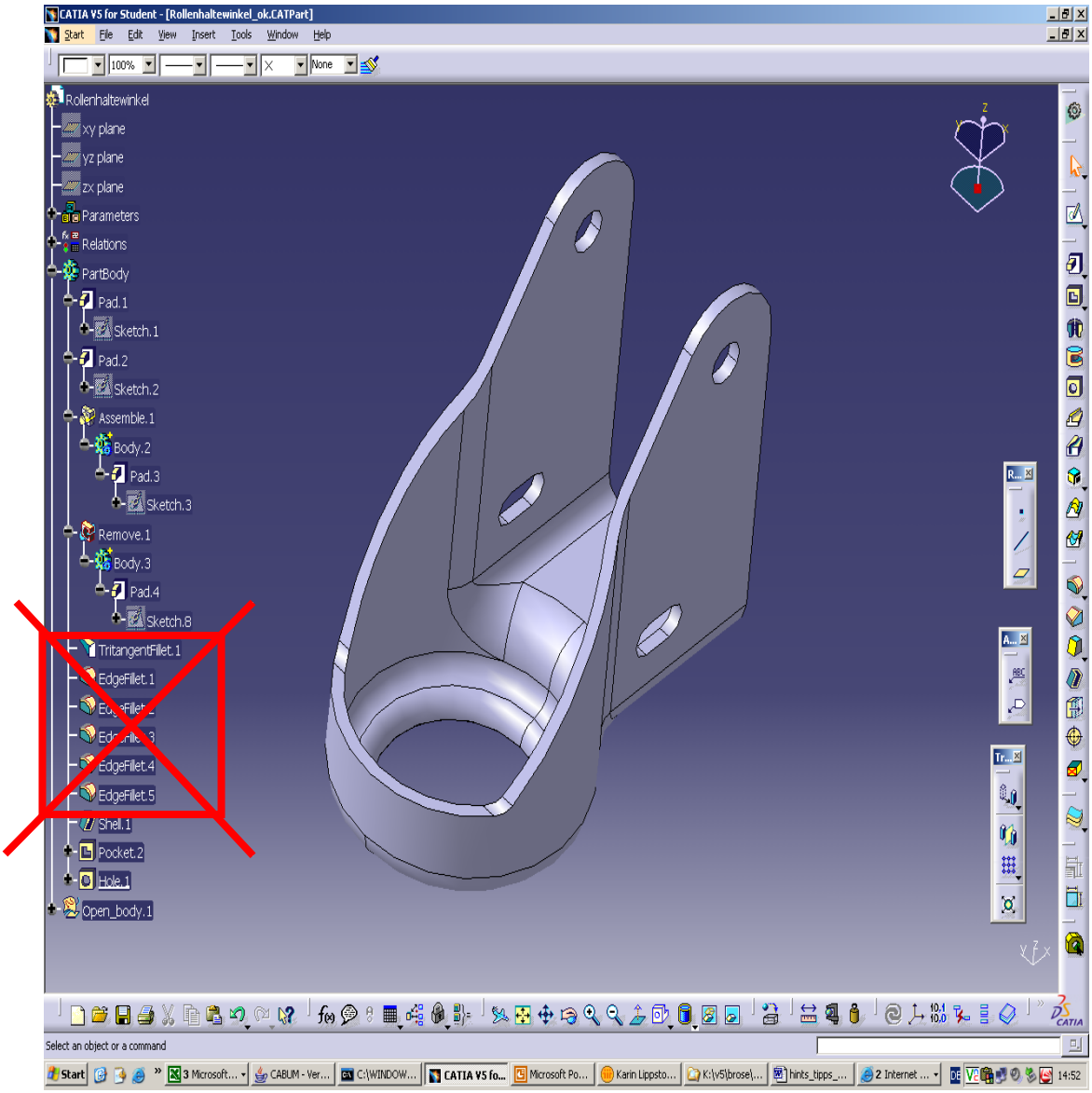


Figure 15.- Example of incorrect methodology

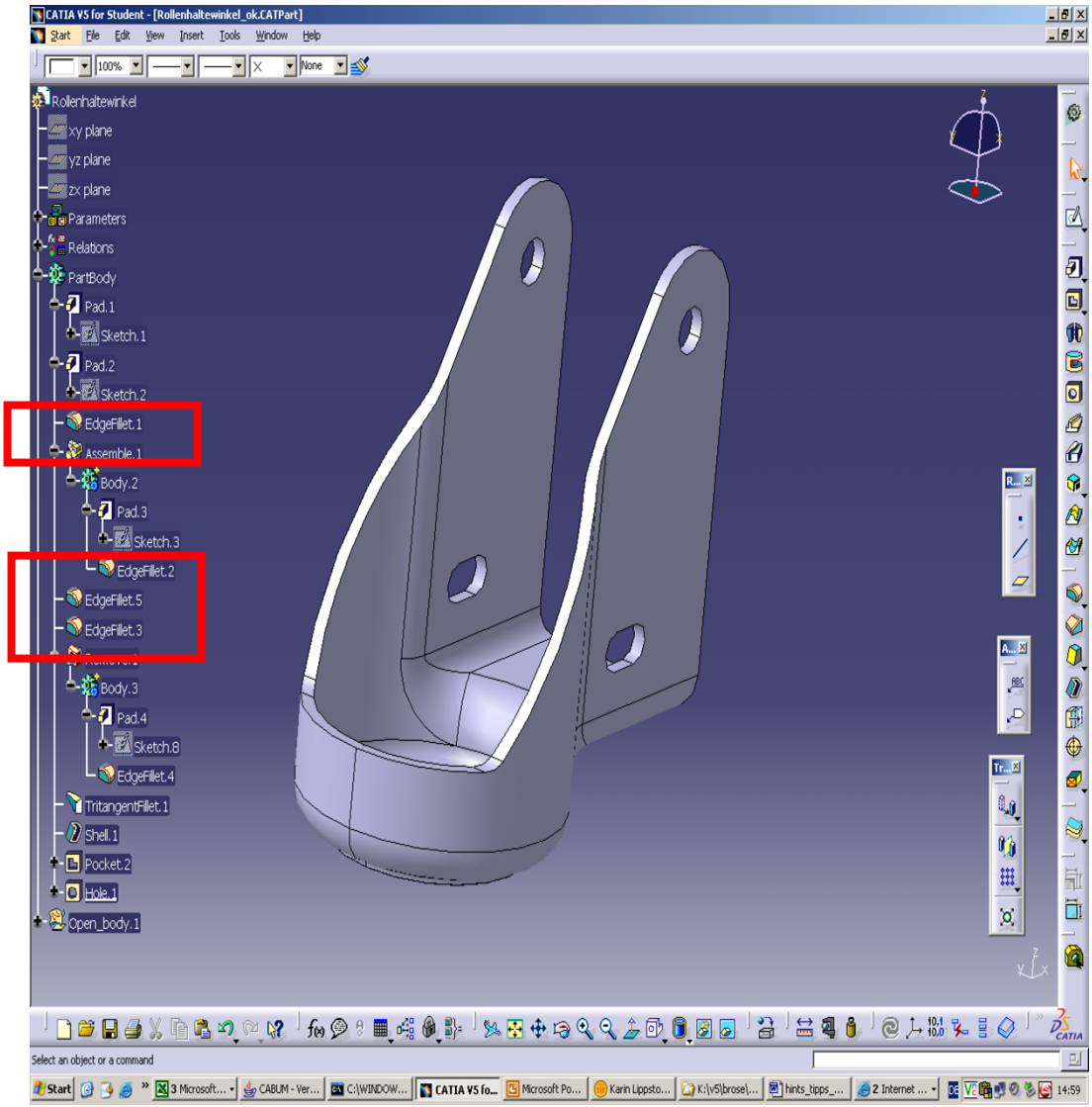


Figure 16.- Example of the correct methodology

Mirror operations on specific features should be located in a specific body together with the features to be mirrored.

Pattern features should be located in a specific body together with the features to be patterned.
This methodology makes updates faster because these patterns are not involved in the updates of other bodies.

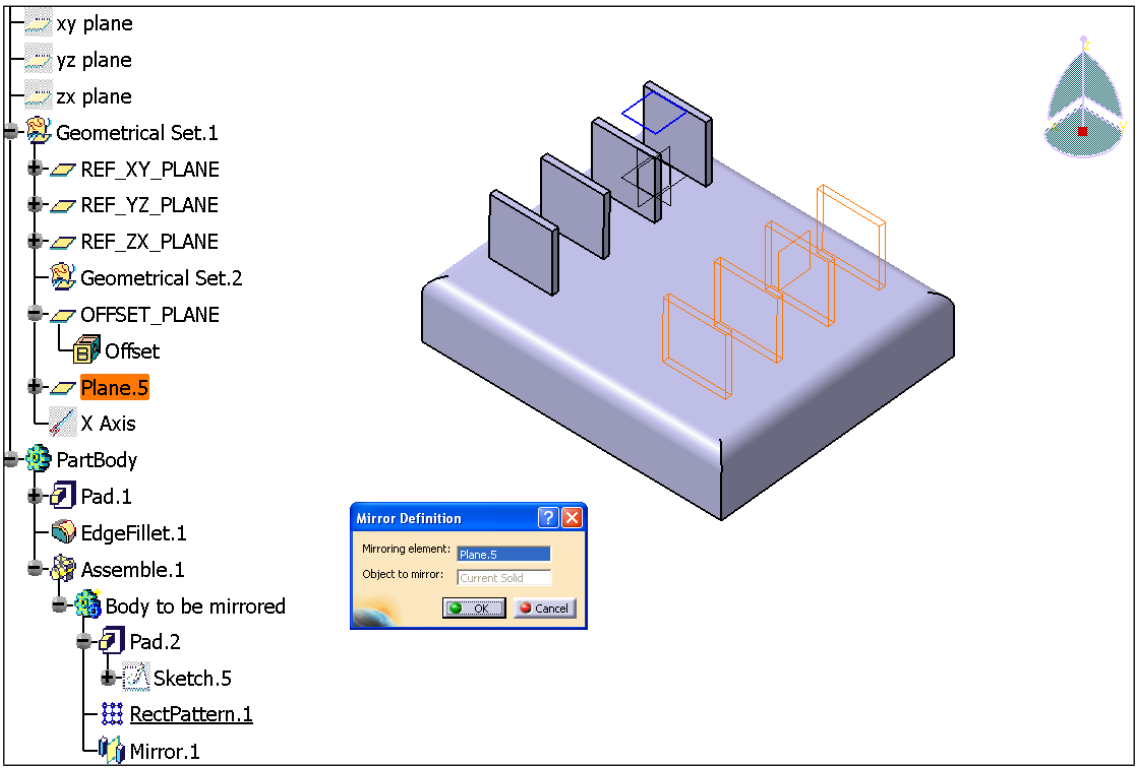


Figure 17.- Example of a specific body for mirror and/or pattern feature

For a pattern of holes use pattern features especially user pattern to be able to reuse the pattern in assembly design for instantiation and positioning of bolts etc.

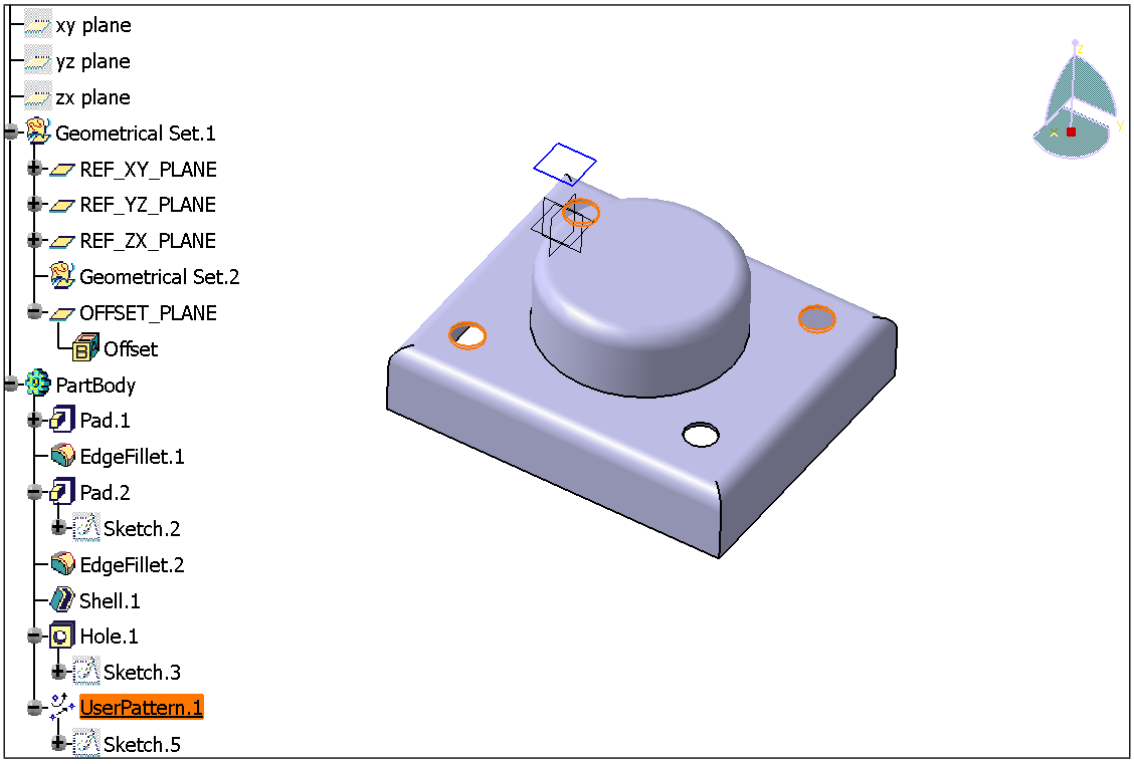


Figure 18.- Example of a User Pattern for holes

If you copy paste with link bodies inside a part or between parts you should make the dress up features like draft and fillet not in the result body.

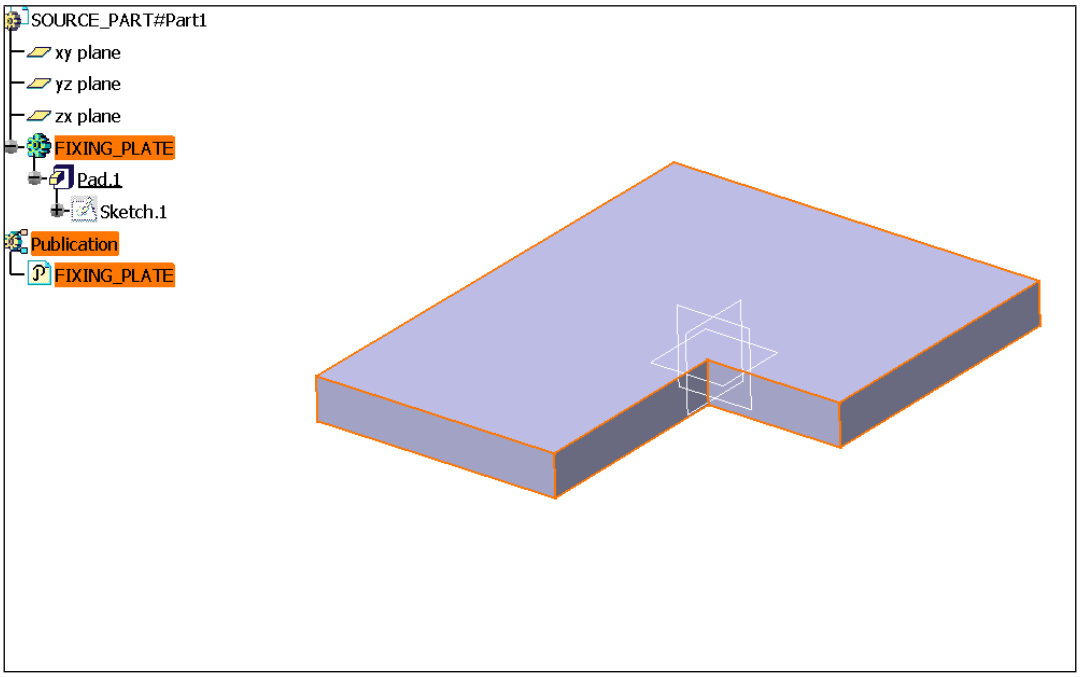


Figure 19.- Source part

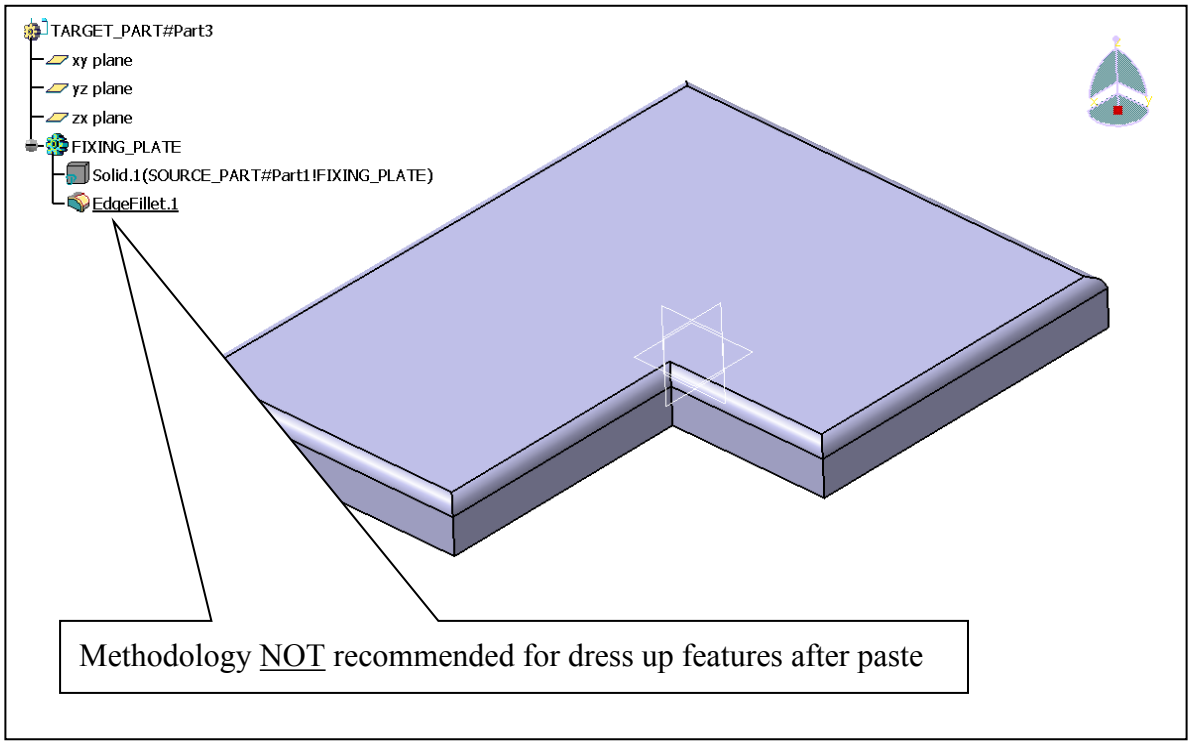


Figure 20.- Methodology NOT recommended for dress up features

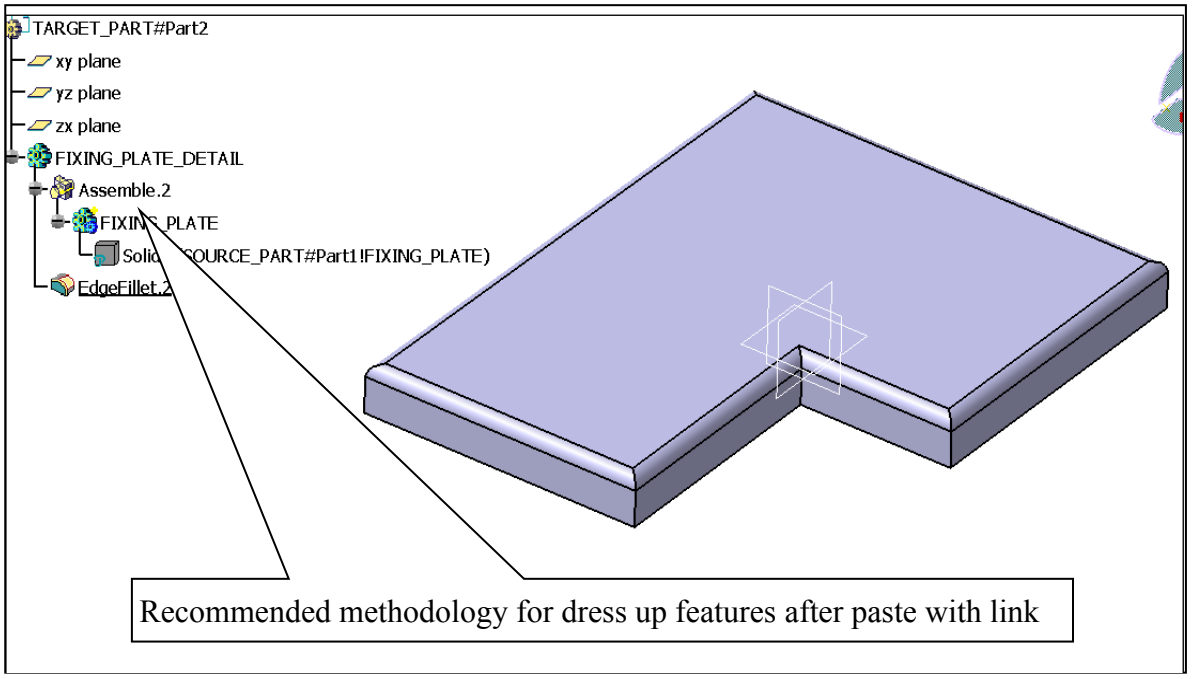


Figure 21.- Recommended methodology for dress up features

2.3.5 Geometrical Set (Shape and wireframe)

It is forbidden to use ordered geometrical sets.

Only the shape and wireframe geometry linked with the solid have to be kept. Before saving the final version of the CATPart you have to use the "delete_useless_elements" function.

2.4 Design guidelines CATProduct. Assemblies

The CATProduct will be the model where the product structure will be defined; therefore the CATProduct structure will follow the PBS structure.

At the beginning of the design task the product structure has to be defined, and the designer will be free to add the new branches he considers necessary.

The part number corresponding to each assembly will be defined using the quality document "F4E-QA-112 Naming Convention". This part number will be identical to the filename.

When a new product has to be created the CATIA function FILE + NEW will be used, after the creation the ITER Properties macro has to be applied as described in section 2.4.1.

For each branch of the CATProduct an instance name has to be defined, the way to define the instance name will be agreed at the beginning of the design task.

It is strongly recommended to use only points, lines and planes instead of edges, faces and vertices for constraints. All parts must be positioned or protected in position by assembly constraints. At least a fix constraint must exist for each part.

2.4.1 Properties definition

In order to reintegrate a CATProduct model in the ITER ENOVIA database some properties and attributes have to be defined. These properties and attributes have to be defined using the macro "ITER_properties", this macro is included in the ITER_Cad_Supplier_Package. Once you execute the macro a window (Figure 22) appears. The following attributes have to be defined in this window Part tab

1. Description Reference. It is a description of the product. It has to be included in the part number and in the filename. There is a limitation to 35 characters.
2. PBS 1, PBS 2 and PBS 3, must correspond with the first three levels of the Plant Breakdown Structure.
3. RO. The ITER Responsible Officer.
4. Change Type. It will be ‘minor change’ if the change doesn’t affect any interface or it is not a conceptual change, otherwise it will be defined as ‘major change’.

- External Part ID. It is the F4E part number; see the document "F4E-QA-112. Naming Convention".

After installing the revision of the ITER CAD Supplier Package 4.3.3 some attributes are compulsory to be filled in. All these new attributes are related to the design logbook. The purpose of the design logbook is to trace all the actions that are performed on a reference that can be a part, an assembly or a drawing.

These new attributes are:

1. Description of the Modification should contain a brief description of the modification like a title of the modification.

2. Description documents link field that can be filled with IDM reference to any document. This could be useful to explain the modifications that have been carried out.
3. Bill of Material field can be filled in the case of assemblies with IDM reference to the BOM related to it.

In the link you will find below you can open the IO How to use design logbook.

ITER_D_3QFDA9 - How to use design logbook

The way to use the design logbook has to be agreed between F4E and supplier/ associations during the design process. The design logbook can be applied at the work package level or the part/product level.

There are some attributes defined in the Document tab of the same window as you can see in the Figure 23, the compulsory attributes are:

1. Description Long. Is a description without abbreviations
2. RO. It is the name of the ITER Responsible Officer.

The others attributes that appear on this window will be defined once the data is reintegrated in ENOVIA.

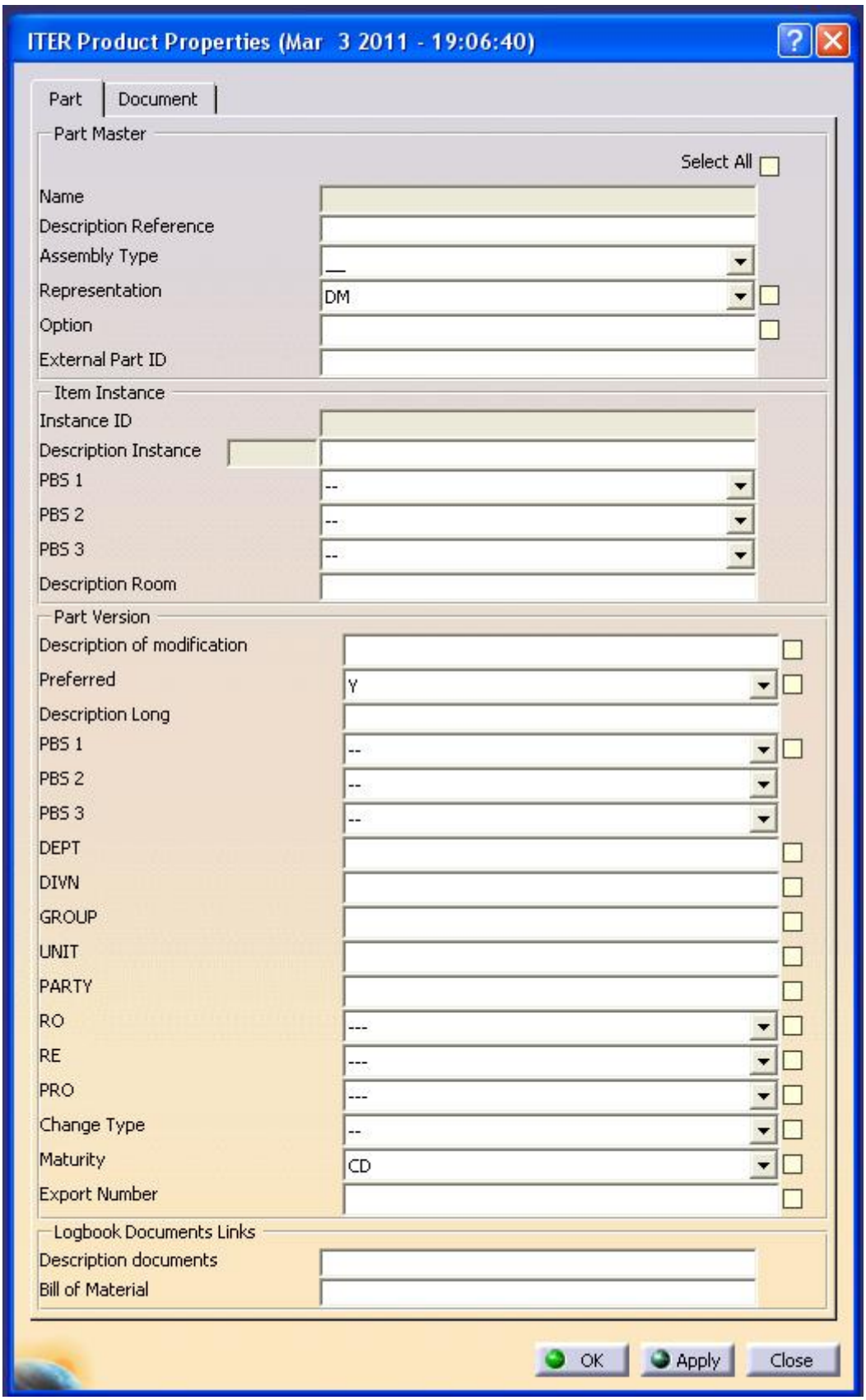
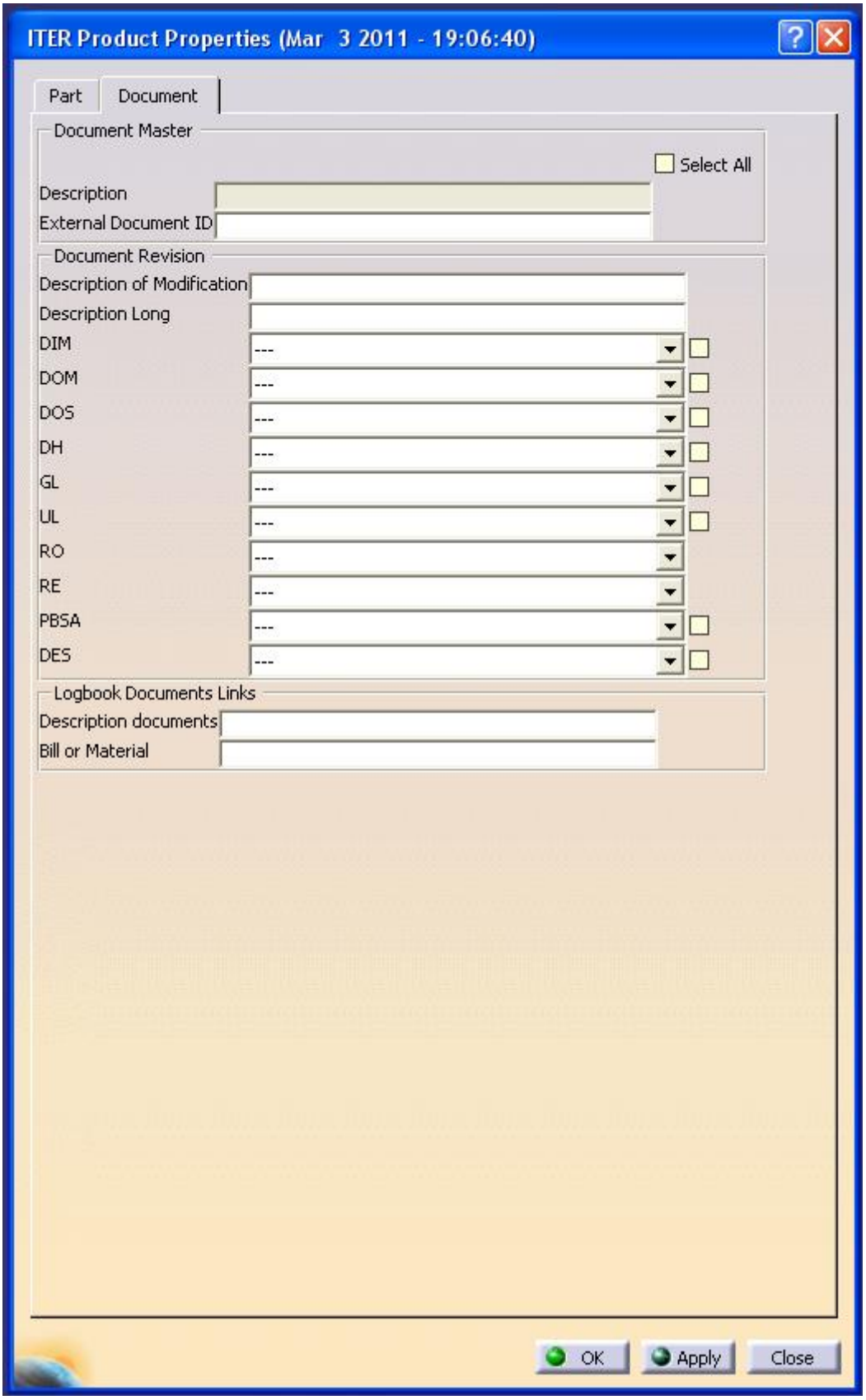


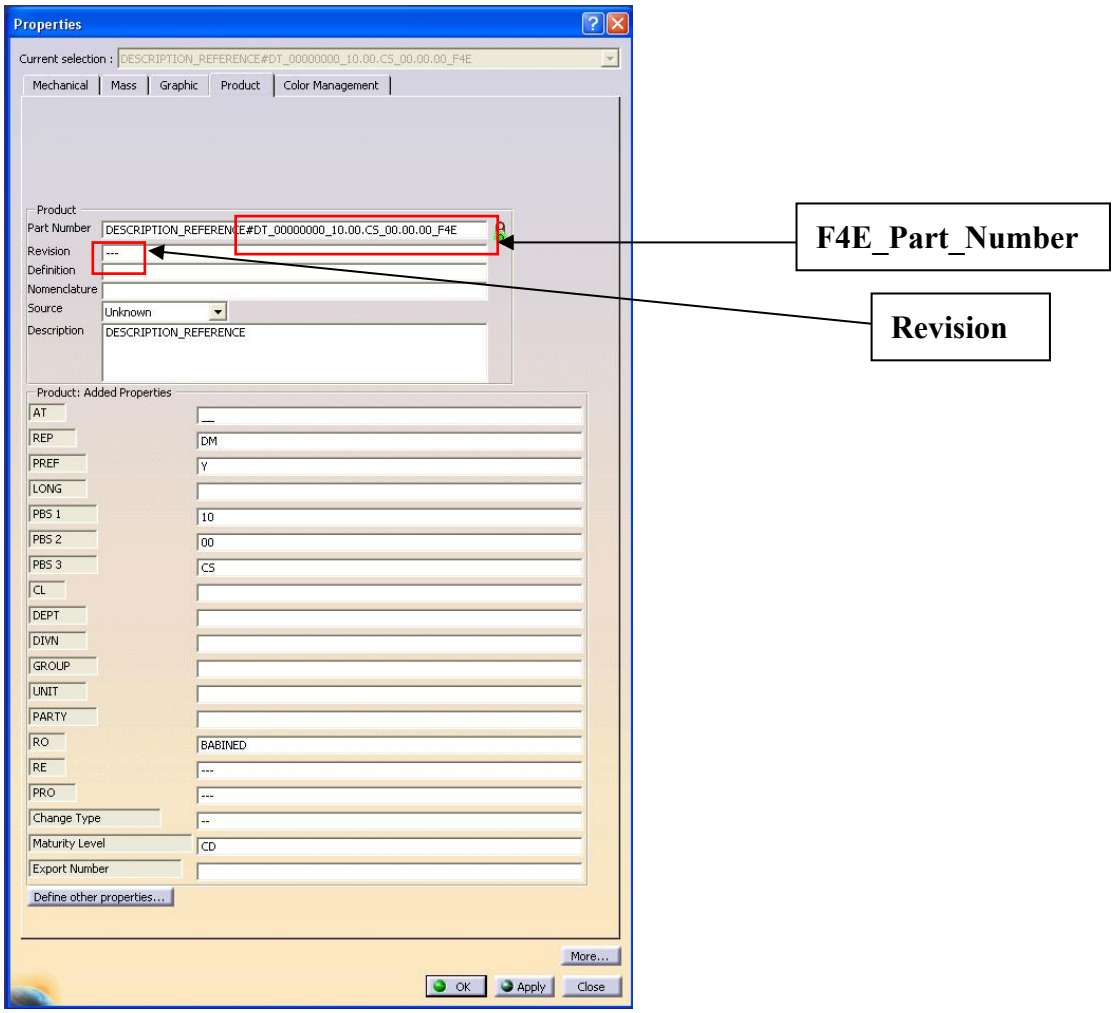
Figure 22.- ITER Properties window


ITER Product Properties (Mar 3 2011 - 19:06:40)
Part
Document
Document Master
Select All
Description
External Document ID
Document Revision
Description of Modification
Description Long
DIM
DOM
DOS
DH
GL
UL
RO
RE
PBSA
DES

Logbook Documents Links
Description documents
Bill or Material
OK
Apply
Close

Figure 23.- ITER Properties window Document Tab

After applying the ITER properties macro, some CATIA properties have to be added, in the default CATIA properties, as shown in the following figure.



Some customized CATIA properties can be defined by the supplier using the CATIA properties window. Once the Modify ITER Properties macro has been applied the button “Define other properties …” will be available as you can see in the image below.

The only requirement to define a supplier’s property is that the property must start with the prefix “F4E_...” as example: F4E_Revision.

2.4.2 CATIA functions not allowed

The following CATIA functions are forbidden. ITER uses different methodologies and/or ENOVIA cannot save the entities created by these functions.

A. In general for all kind of assemblies the following functions are forbidden:
   i. ASSEMBLY DESIGN + REUSE PATTERN + KEEP LINK
   ii. ASSEMBLY DESIGN + ASSEMBLY FEATURES
   iii. ASSEMBLY DESIGN + SYMMETRY
   iv. COMPONENTS+NEW COMPONENT

B. For work package the following functions are allowed:
   i. ASSEMBLY DESIGN + SCENE
   ii. STRUCTURE DESIGN
   iii. WELD DESIGN
   iv. EQUIPMENT & SYSTEMS
   v. DMU FITTING
   vi. DMU KINEMATICS

C. For structure exposed assemblies the following functions are allowed:
   i. DMU sections
   ii. DMU clashes
   iii. DMU annotations

2.5 Standard Parts

In the ITER Project the mechanical standard parts will be available using the CADENAS library, for companies working in asynchronous mode they will have a web access.

If a standard part is not included in the CADENAS library, this part must be designed to the ITER standard part rules:

- Data formats: Neutral formats for example IGES are not permitted. The history of V5 solids is required for analysis purposes.

- Shortened Standard fastener lengths: When a bolt or screw is shortened in length. The standard un-modified length must be shown in the long description. E.g. 115mm long

machined from 120 mm long. The short description would be M20x115_CAPSCREW. The long description would be MADE_FROM_M20x120.

- PBS level: Standard parts must only belong to ITER PBS 7.6 (Design Office).

- Modelling methodology: Single part single body methodology is to be used generally. Single part multi- body methodology can be used for 'Superbolts' etc. CATIA products must not be used.

- Design: 'X' axis is used for axis of the fastener. The fastener **'Face'** or **'Component'** lies on 'YZ' plane. The head, nut or washer is modelled in the positive 'X' direction. Colour for thread RGB 128/0/255. All planes are in hide. Open bodies are in hide. Axis is in hide.

- Publication names

Axis	for the axis of bolts, screws, nuts and washers.
Face	for the contact surface of bolts, screws and nuts.
Component	for the contact surface of the component side of washers.
Fastener	for the contact surface of the fastener side of washers.
Edge	for the contact surface of countersunk screws.

2.6 Design guidelines CATDrawing. Drawings

The model to define the drawings will be the CATIA CATDrawing.

For drawings the ITER.xml drafting standard must be used, that is included in the ITER_Cad_Supplier_Package.

The drawings have to be generated from one of the starter models that will be provided to the supplier at the beginning of the task, there will be an F4E starter model for each size of drawing that is allowed:

A0 (841x1188)- F4E_BCN_TEMPLATE_DRAWING_A0#XXXXXX.CATDrawing
A1 (594x841)- F4E_BCN_TEMPLATE_DRAWING_A1#XXXXXX.CATDrawing
A2 (420x594)- F4E_BCN_TEMPLATE_DRAWING_A2#XXXXXX.CATDrawing
A3 (297x420)- F4E_BCN_TEMPLATE_DRAWING_A3#XXXXXX.CATDrawing

A4 (210x297)- F4E_BCN_TEMPLATE_DRAWING_A4#XXXXXX.CATDrawing

Several sheets of one drawing are made as sheets in one CATDrawing document. The first sheet will be the modification sheet.

The sheet scale must be used for the general scale the views in a sheet instead of individual view scale values.

Assembly and single part drawings are separated CATDrawing documents.

CATIA links between CATDrawing files are not allowed. The allowed links to 3D documents are described in the section 6.2 of this document.

As a general rule drawings are made with the EXACT VIEW option. For isometric views and special purposes the Raster mode is allowed.

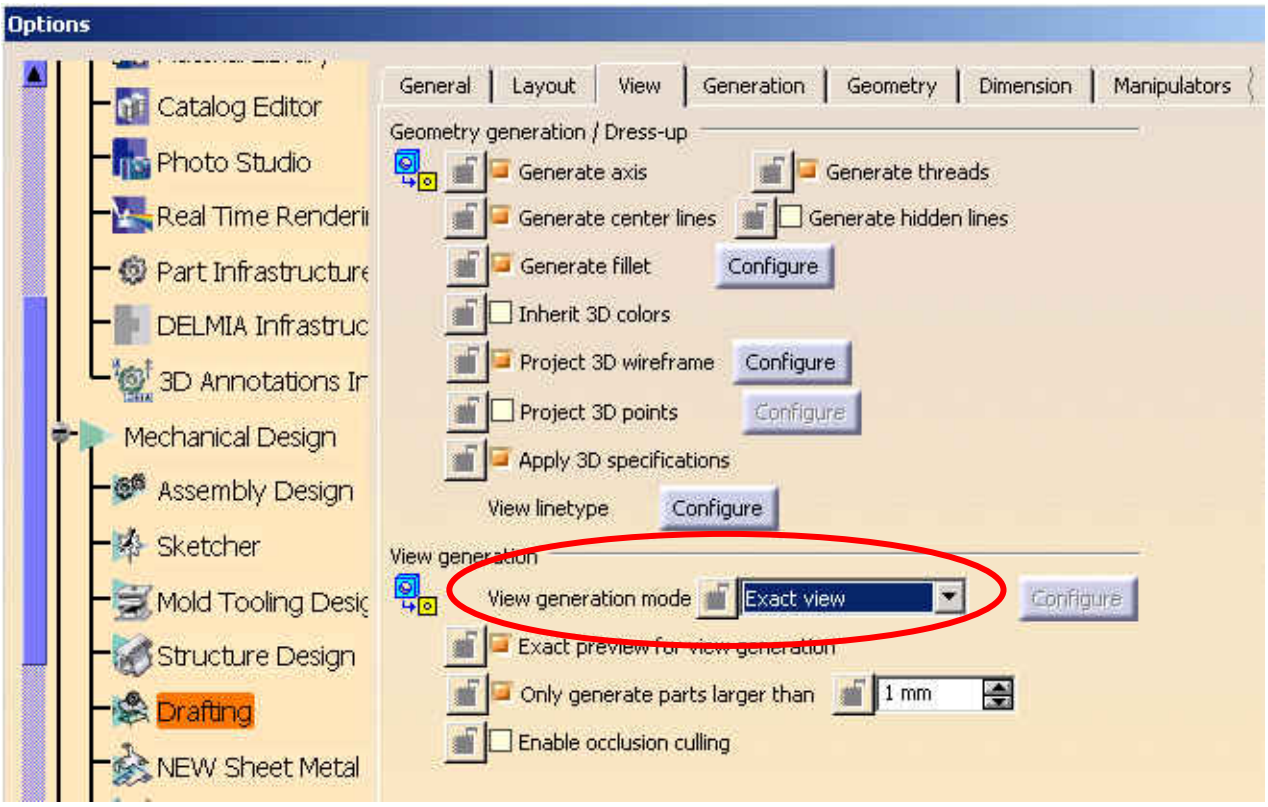


Figure 24.- View Generation Mode

In special cases the drawings can be made with the CGR, APPROXIMATE or RASTER option. Sections can be made saving DMU sections as CATDrawing. The reason is that otherwise, using EXACT VIEW, it is impossible to generate the view or section due to the system resources needed.

2.6.1 Properties definition

Description fields for drawing creation.

In order to reintegrate a CATDrawing model in the ITER ENOVIA database some properties and attributes have to be defined. These properties and attributes have to be defined using the macro "ITER_properties", this macro is included in the ITER_Cad_Supplier_Package. Once you execute the macro a window (Figure 25) appears. The following attributes have to be defined in this window:

1. Description, description that will appear on the first line of the denomination in the title block
2. External Document ID, this attribute is the F4E Part Number following the F4E Naming Convention QA-112
3. RO , name of the Responsible Officer
4. All the attributes related to the design logbook have to be filled in for the drawing; you could find a link to the IO How to use the design logbook above.
5. Description of Modification, it should contain a brief description of the modification like a title of the modification.
6. Description documents link field that can be filled with IDM reference to any document that could be useful to explain the modifications that have been done.
7. Bill of Material field can be filled in the case of assemblies with IDM reference to the
8. BOM related to it.

The others attributes will be defined once the data is reintegrated in ENOVIA

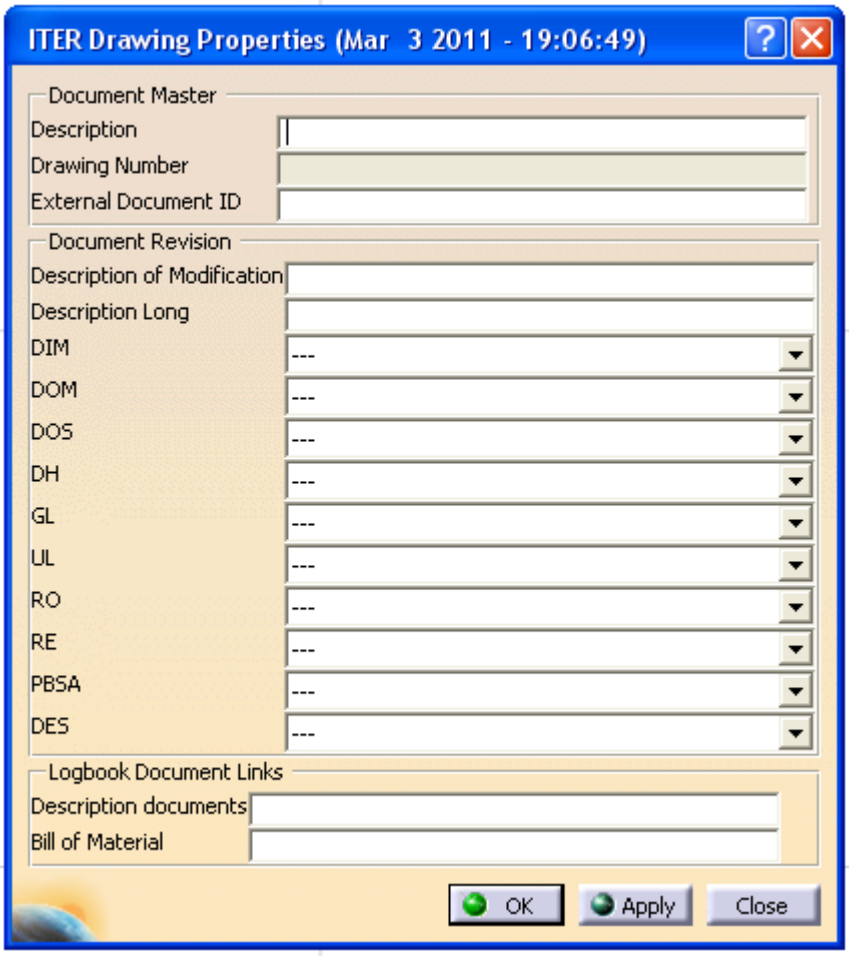


Figure 25.- Drawing Properties Panel

As for drawings the CATIA properties does not exist, if the supplier has to create some customized property a parameter can be created using the following naming rule for the property. The property name always have to start with the prefix “F4E_” (F4E_Smarteam_ID).

2.6.2 Types of drawings

We have the following types of drawings:

A. Single part drawing based on one CATPart containing one body (multi-part approach).
B. Assembly drawing based on assemblies showing all parts of this assembly.

Single part drawing (type A) based on one CATPart containing one body (multi-part approach):

The links of the views in the drawing are only pointing to a specific CATPart. To achieve this, open the CATPart in a separate window before you generate the first view. Use the EDIT+LINK function to check.

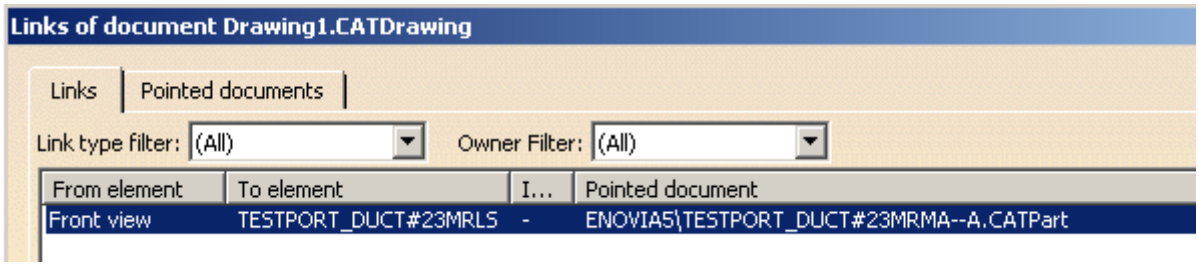


Figure 26.- Multi-part Approach

Assembly drawing (type B) based on assemblies showing all parts of this assembly in the same 2D views.

The links of the views in the drawing are only pointing to a specific CATProduct. Use the EDIT+LINK function to check this. To achieve this, the user must open the Work package assembly in a separate window before he creates the first view.

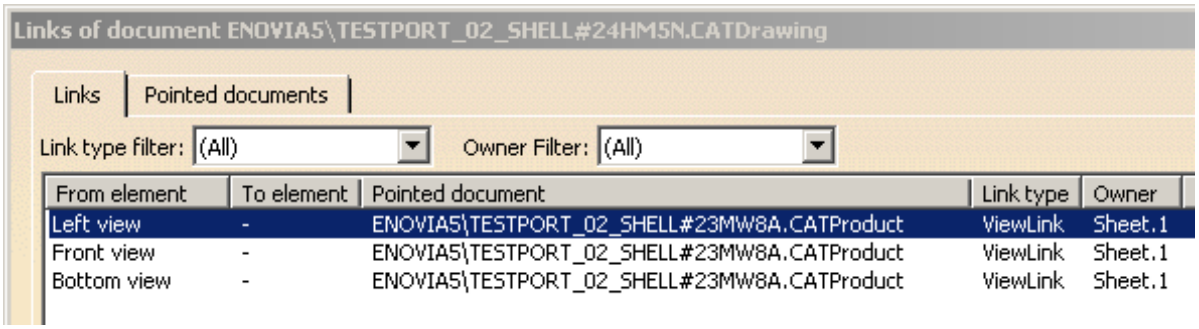


Figure 27.- CATIA link

The assembly drawing is only an image of the original data. All modifications of structure and position must be performed first on the original data and propagated afterwards to the data inside the drawing. Geometrical modifications on the CATPart or structural or positioning modifications inside a subassembly are automatically inherited.

If not all parts in the assembly have to be shown in a specific view, the CV5 function overload properties have to be used. Hiding parts or Bodies for the view update operation is not accepted.

2.7 Preparation of the information before reintegration

The following tasks must be carried out before saving the CATIA data. Then the information can be sent to F4E:

A. Unnecessary elements should be deleted especially environment data which is copied for temporary usage.
B. Auxiliary geometry like wireframe, sketches, surfaces planes etc. must be hidden
C. The last feature in a part design body or the whole body must be the "Defined In Work Object"
D. The CATDUA utility must be applied with the clean option
E. The documents to be sent and all the documents linked to them should be located in the same folder.
F. The following links between CATIA documents or CATIA documents and other documents are allowed:
   i. Links between CATProduct and other CATProducts (sub assemblies) or CATParts.
   ii. CCP links and links to parameters between CATParts - skeleton parts and driven parts, symmetrical parts.
   iii. Links between CATDrawings views and CATParts or CATProducts.
   iv. Links between CATIA documents and Catalogues synchronized with ITER IO.
   v. Links between CATIA documents and material libraries synchronized with ITER IO.
G. The following links between CATIA documents or CATIA documents and other documents are not allowed and must be isolated:
   i. Links between CATDrawing.
   ii. Links between CATParts without the skeleton approach.
   iii. Links between CATIA documents and design tables, local material libraries, local catalogues, knowledge ware rules etc.
H. Once Q-checker is available. Each model has to pass Q-checker with the IO profiles, and each model has to pass the quality criteria defined by the IO.
I. Use always the relevant (normally the most recent) set of data received from ITER.
J. If you have sent new data to ITER, do not continue to work on this set of data in parallel. You have to wait for a new dataset from ITER containing the ITER ID etc. Further changes have to be made with this new set of data received from ITER.

All of these points could be checked using Q-checker with the IO profile.

2.8 Plant Design

For Plant design refer to the IO CAD manual Section 12.

F4E CAD Manual

Section 3

Collaboration Processes

3. Section 3. F4E COLLABORATION PROCESSES

3.1 What infrastructure is needed to work with the F4E DO

The F4E DO will inform the European industry, services, Institutions and Laboratories (Suppliers). About changes in release, settings and standards and will provide the specific files and a description of the modification.

3.1.1 Release and operating system

All CATIA V5 data is generated and modified using the CATIA release specified by F4E according to ITER requirements. For the current release please see the latest ITER CAD Manual section 7.1

The language environment of CV5 and the operating system must be English otherwise the behaviour of the software can be different from the F4E DO installation.

3.1.2 Settings

The installation of the ITER CAD Supplier Package is the way to set up the CATSettings to work in the ITER Project. The installation is described in section 2 of this Manual.

The CATIA V5 settings which are not specific to an installation, like paths that influence the structure of the data, must be identical to the F4E DO settings (see Examples)

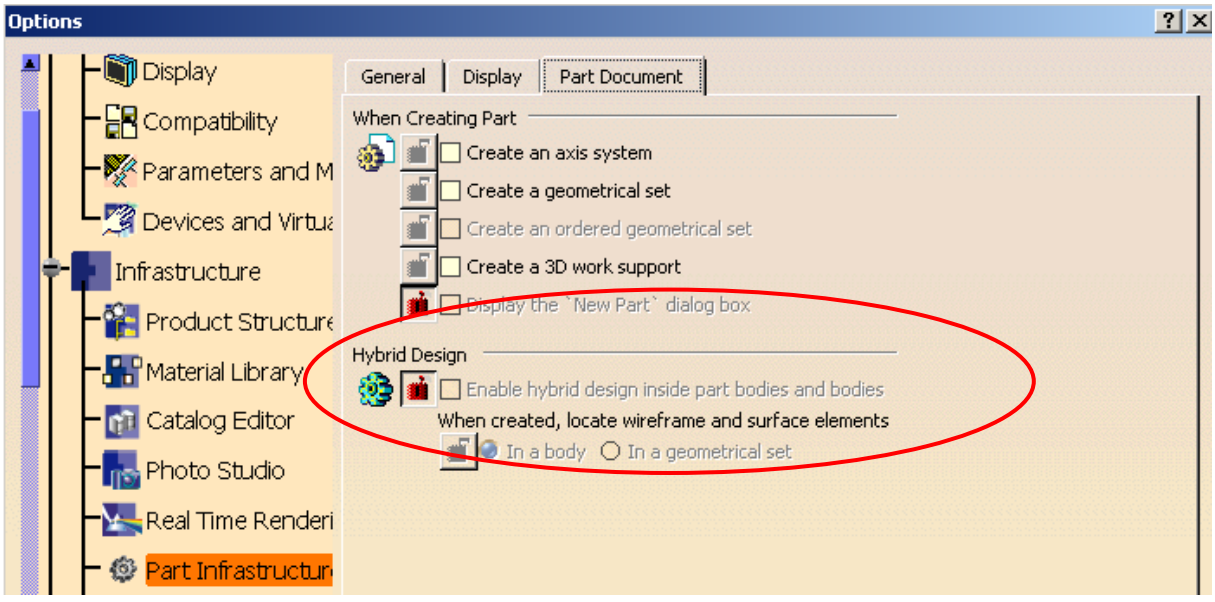


Figure 28.- Hybrid Design

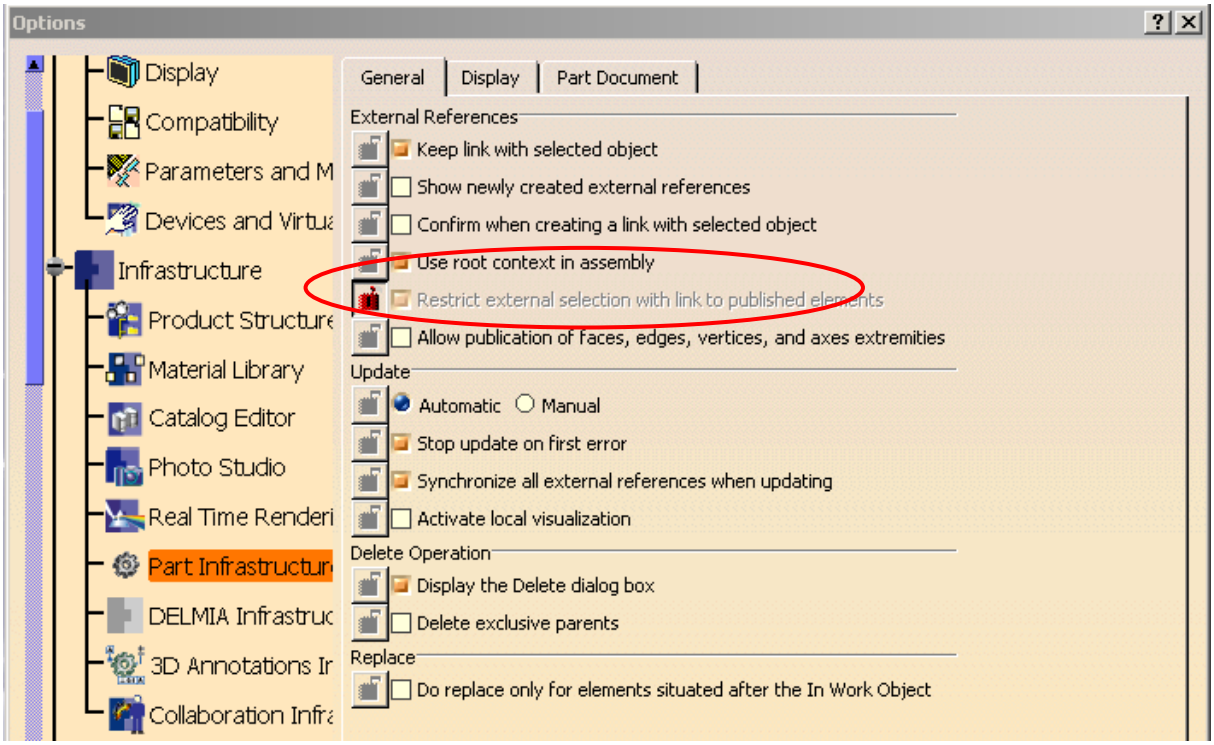


Figure 29.- Published Elements

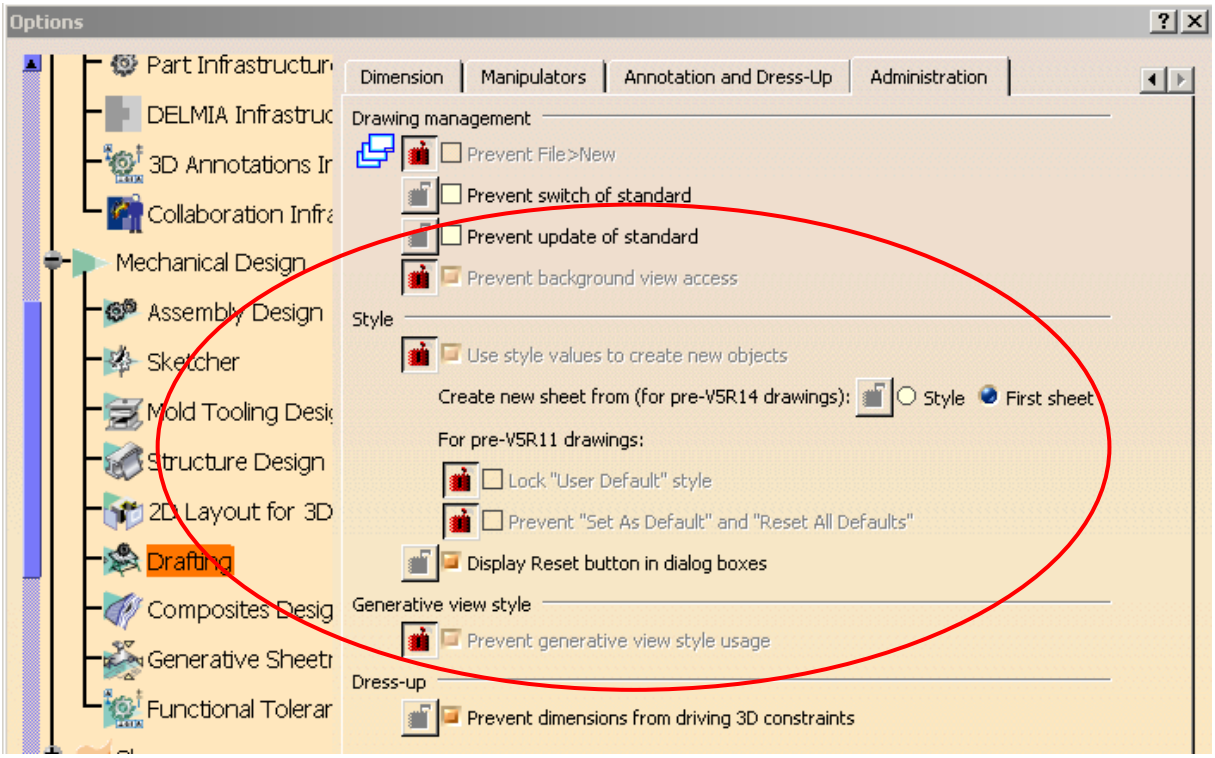


Figure 30.- Drawing Management and Style

3.1.3 Schema of Design Collaboration. Asynchrounous approach

This section describes the different steps of the process of design collaboration in an asynchronous mode. The design work is based on CAD data in the ENOVIA database at the start of the work, these data are transferred to a company or association that carries out the design work, and finally the data are reintegrated back to ENOVIA.

The process starts with a Data Exchange Task (DET), in this task the IO DO collects all the CAD Data related to a design task, the data are classified in two kinds contextual data (defining the environment) and design data (data to be modified by the company), this information is send to the company together with an excel file, that describes the files included in the DET as design data, this excel file has to be returned to the IO describing the changes carried out to the CAD data, see section 3.3 in this manual.

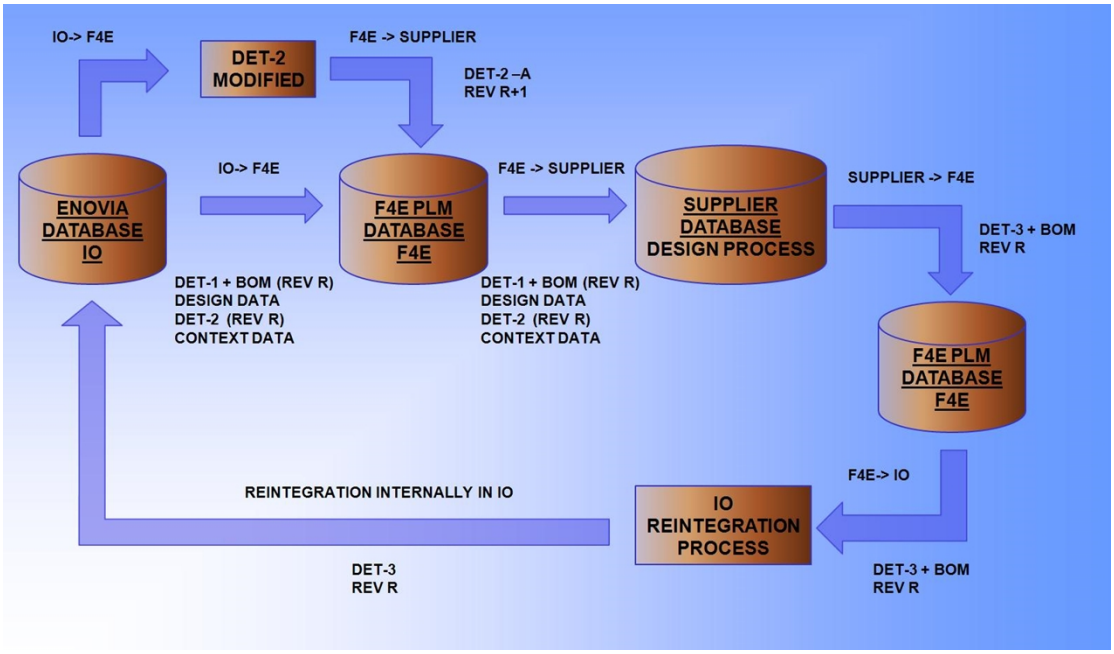


Figure 31.- Data Exchange Task Process

The DET process is described in section 3.4 in this F4E CAD Manual.

The filename of the design data coming from the IO has to be unchanged; if some new design data has to be added the naming convention described in section 3.1.3.2 of this manual has to be

followed. A list of the design data modified, added new or deleted has to be provided for reintegration together with the CAD data.

3.1.3.1 F4E Numbering System

See the document F4E QA document F4E-QA-112 latest issue.

3.1.3.1.1 Glossary of terms

Part number.- Is the code that identifies a component in the ITER project

CATIA filename.- Is the filename of the CATIA file that contains the 3D CAD information of a component.

Drawing number.- Is the code that indentifies a drawing.

CATIA Drawing filename.- Is the filename of the CATIA file that contains the CAD information relative to an actual drawing.

DOC_TYPE.- Defined in the F4E naming convention to describe the kind of component/file:

- PR .- Assembly / CATProduct
- MD.- Single part/ CATPart
- DR.- Drawing / CATDrawing

3 PBS Levels.- 3 main levels defined by the IO
Customized Level.- 3 extra PBS levels customized by the supplier

Sequential number.- Sequential number unique identifier for the component, a block of numbers will be provided by F4E to their suppliers upon request.

Originator.- Identifies the originator of the information
Description Reference.- Is an ITER property that has to be filled out, it is a description of the component. The IO uses it to build the part number and the filename.

Random Number.- Is the ITER unique identifier, it is an ITER property that is assigned by ENOVIA once a CATIA file is stored in the database.

ITER Part Number.- In ITER the part number is assigned as follows:

“Desciption_Reference#Random_Number”
ITER Filename.- In ITER all the files are named as follows: “Description_Reference#Random_Number Rev”.

ITER Drawing number.- Is a sequential number that is assigned to a drawing once the drawing is stored in ENOVIA, it will appear in the ITER Title Block. The drawing number is different from the Random Number assigned to the CATDrawing filename.

F4E Unique Identifier.- Is a combination of the Document Type and a 8 figure sequential number.

3.1.3.1.2 F4E Naming Convention main rules

This section explains how the CAD data has to be named according to the F4E numbering system. This naming convention will be applicable for internal design work at F4E or in the manufacturing phase as agree between F4E and the supplier. When the design work has to be reintegrated to IO a modification of this naming convention will be applied as is described in the following section.

The main rules are:

- The filename and the part number of a component have to be the same.
- The DOC_TYPE plus the Sequential number will be the unique identifier of the component; the other fields are extra information.
- For a single part/assembly the following documents must have the same Sequential Number: CATPart/CATProduct and CATDrawing.
- The F4E part number has to be defined in the ITER Property “External_ID”

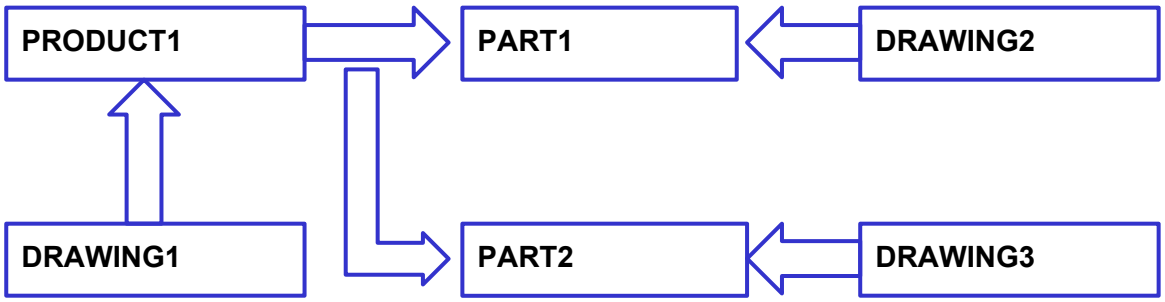
This is an example of a typical F4E part number:

DT_00000000_00.00.00_00.00.00_F4E

Unique Identifier		Additional Information		
DT	**00000000**	**00.00.00**	**00.00.00**	**F4E**
Doc. Type	Sequential Number	3 levels PBS	Extra 3 levels of PBS	Originator

3.1.3.1.3 Example of a Product Structure

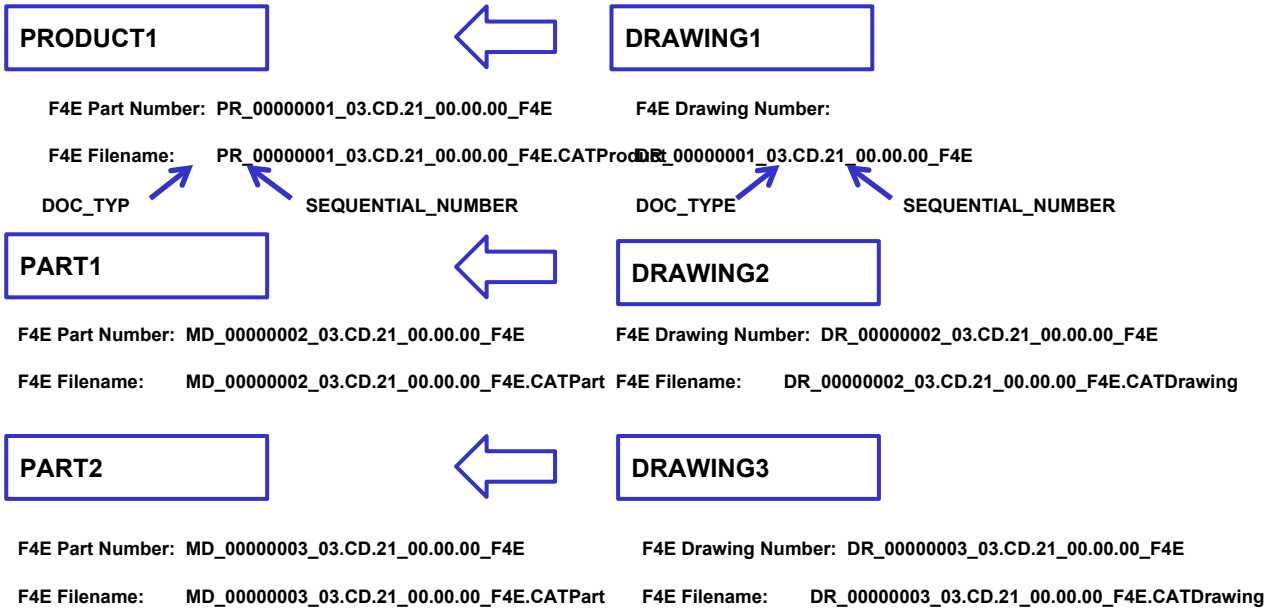
This is a typical example of a product linked to two parts, and with three drawings relatives for each part and for the product.



PRODUCT1 assembly composed of two single parts PART1 and PART2
DRAWING1 drawing which is linked to the 3D PRODUCT1
DRAWING2 drawing which is linked to the 3D PART1
DRAWING3 drawing which is linked to the 3D PART2

3.1.3.1.4 Example of the F4E Naming Convention

Here we have the example of how we are going to apply the F4E naming convention numbering the components and naming the CAD data files.



3.1.3.2 Naming for ITER reintegration

When the CAD data has to be reintegrated into ENOVIA the ITER naming convention has to be applied. But the ITER naming convention includes a random number that is assigned by the system, we can't assign the random number to the filename, as a consequence we are going to replace temporarily the random number by the F4E number until the file is stored in ENOVIA.

In the next sections there are some examples about how to name the CAD data files in order to make the reintegration to ENOVIA possible.

3.1.3.2.1 Example of a Product and Drawing linked

In the figure bellow you can see a typical CAD data structure for a product and the drawing linked to it. To build the filename of the CAD files the ITER attributes Description Reference and External ID must be used.

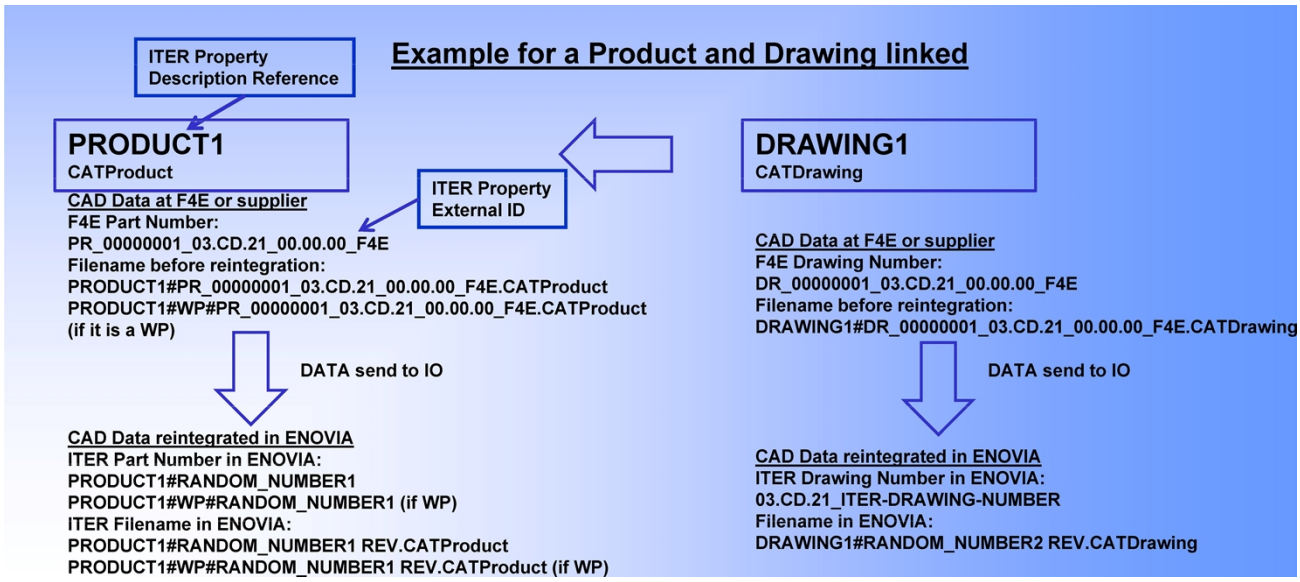


Figure 32.- Drawing linked to CATProduct

Section 2.2.2 explains how to define the ITER Properties “Description Reference” and “External ID” mentioned above.

3.1.3.2.2 Example of a Part and Drawing linked

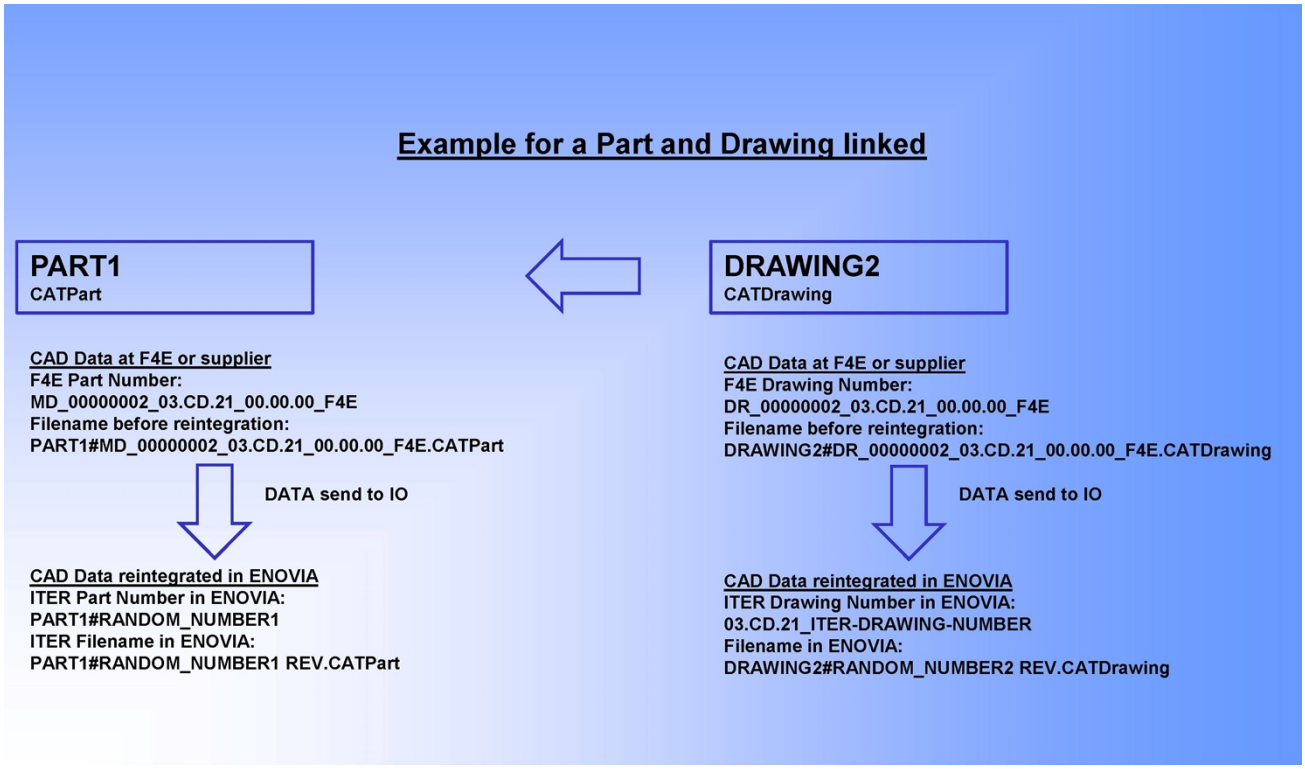


Figure 33.- Drawing linked to CATPart

3.1.4 Schema of Design Collaboration. Synchronous approach

This section describes the Synchronous mode of design collaboration. In the synchronous scheme the supplier is developing their design activities directly connected to the ENOVIA database. A specific PRC or branch will be created for the design task developed by the suppliers.

There are different ways to connect the suppliers with the ENOVIA database, the kind of connection will be agree between F4E and the supplier at the beginning of the design task. The possibilities are the followings:

- The supplier designer are working physically in IO site
- The supplier's DO is connected to ENOVIA using the Teradici, a "CITRIX like" solution. In that case the supplier's designers are working in the supplier's DO.
- The supplier's DO is connected to ENOVIA through a VPN collaborative network. In that case the supplier's designers are working in the supplier's DO.

In the synchronous scheme of collaboration the F4E and IO CAD Manual rules have to be followed. Taking special attention to the F4E specificities related to the External ID (see sections: 2.3, 2.4 and 2.6).

The exchange of information between IO, F4E and suppliers is based on the DET process even if the information is always in the ENOVIA database. To transfer the information between IO, F4E and supplier a DET has to be issued and a change of ownership in the data will occur. See the scheme bellow to understand the process.

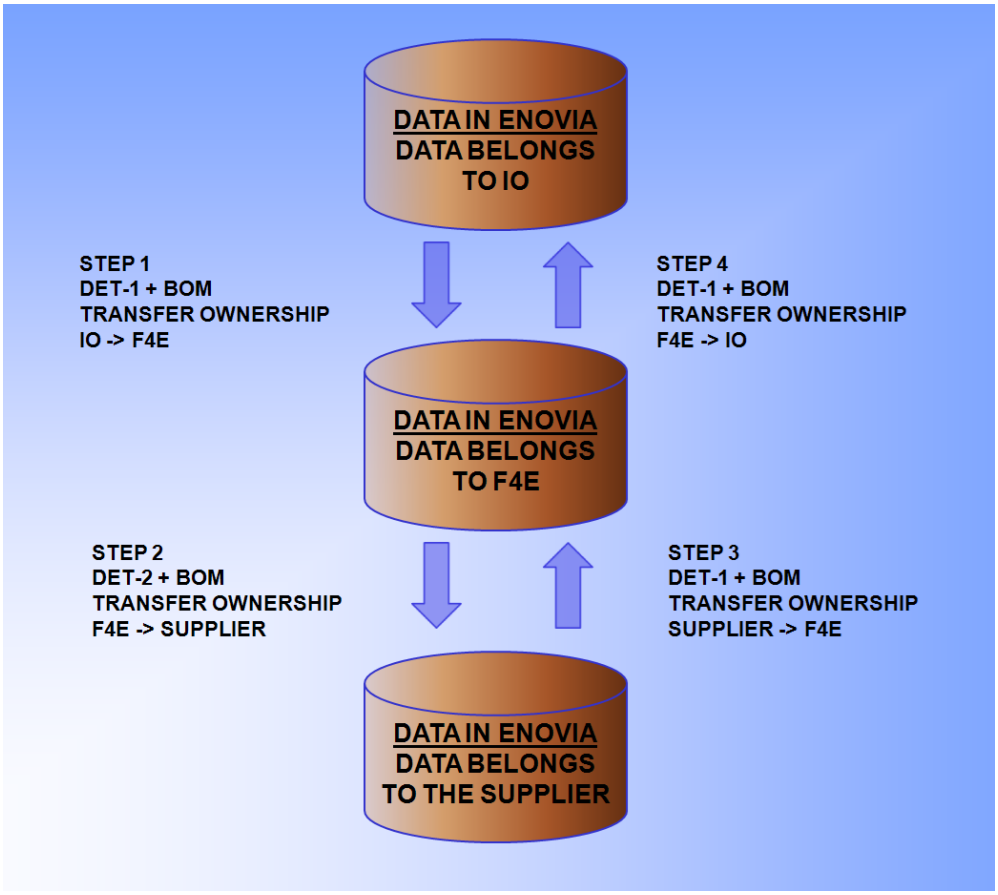


Figure 34.- Data exchange process in a synchronous scheme

Every time the data has to be exchanged a transfer of ownership is needed, a DET process will explain the reason of the exchange and a Bill of Models is required.

In section 3.2 of this manual there is an explanation about the lifecycle of the CAD data working in a synchronous scheme of design collaboration.

3.1.5 F4E Lifecycle of the CAD data and revision

The CAD data (CATPart, CATProduct and CATDrawing) can be in the following status of approval:

W - In Work. The data are created new is the first status of the lifecycle. The data from W is promoted to C, it is the designer who promotes to C.

C - In Check. The data are ready and is in the process of revision. The data from C is promoted to D once all the workflow is completed.

D - Draft . The data are in a minimal status of approval, functionally and from a formal point of view the part is reviewed. The data from D is promoted to R.

R - Reviewed. The data are being reviewed to pass a final status of approval ready for manufacturing. The data from D can be promoted to A.

X - Rejected. The data is not approved, a new version of the part has to be created or simply the part is cancelled.

A - Approved. The data has completed the workflow and is finally approved and ready for manufacturing.

The status will be a parameter managed by the F4E PLM system when available, and the workflow will be electronic.

The CAD data CATPart, CATProduct or CATDrawing, are always created as new in the revision --, if a new revision is needed the following revision will be --A, --B, and so on.

The revision will be a parameter managed by the F4E PLM system and will be included in the properties of each document as shown in the figure bellow.

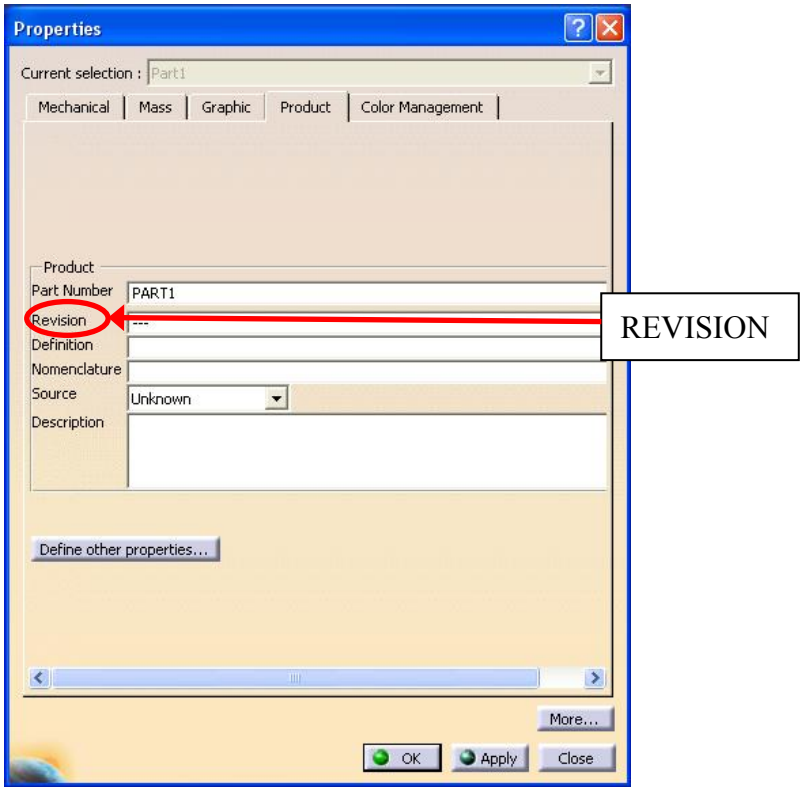


Figure 35.- CATIA Properties Revision

3.1.6 Environments: E&S PRM, File-based (TBD)

3.1.7 Drawing Title block

The drawings will have on the bottom right hand corner the title block of the owner of the drawing. For drawings produced by IO or F4E the IO or F4E title block will appear in the bottom right hand corner.

For the drawings produced by the manufacturer/supplier (owner) must have their own title block in the bottom right hand corner. The full supply chain / lifecycle must be identifiable on the drawing: this implies for the DA and for IO to show their recording of the drawing onto the drawing itself.

All this is implemented in the following way:

- The supplier drawing sheets shall comply with the standards: ISO 5457-1999 and ISO5457/A1-2010
- The supplier shall apply its own title-block in the bottom right hand corner of the drawing area.

- The supplier shall keep the bottom border and the right hand border clear of any grid line, graphical sign or text, these areas being reserved for DA and IO banners

See the IO document Drawings identification, Title-Block and Banners (ITER_D_44GVSF) for details.

The content of the supplier's title block has to be agreed and approved by F4E. The supplier can use the F4E title block adding its own logo.

3.1.7.1 ITER Title Block

The ITER title block is located on the CATIA background. The supplier is not allowed to modify this title block or to use the CATIA background if the ITER title block is present.

3.1.7.2 F4E Title Block

The 'F4E_TITLEBLOCK' view will contain always the F4E title block.A template file containing the drawing frames will be provided to the supplier.

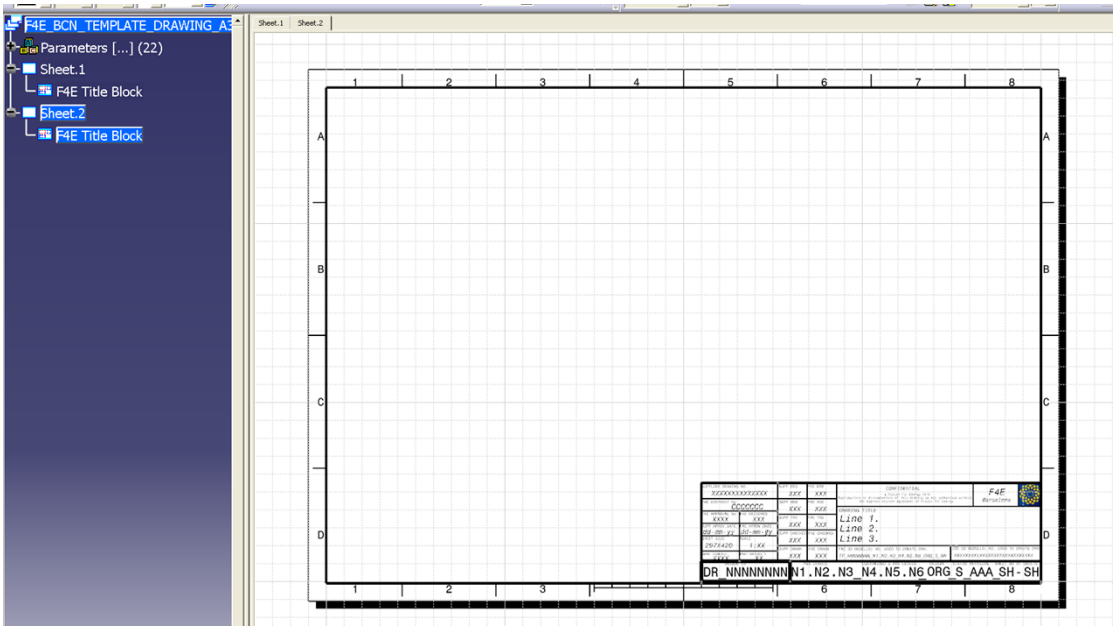


Figure 36.- Location of the F4E Title Block

The F4E title block will be generated by the F4E PLM system when it is in production. Until that time it will be filled in manually. Each supplier will be given a block of numbers to use. They will be transferred to the F4E PLM system when it is operational.

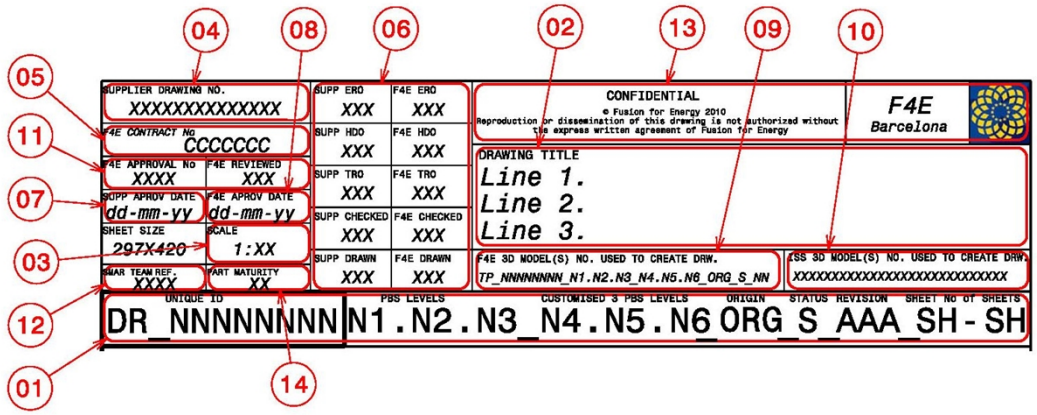


Figure 37.- F4E Title Block

3.1.7.3 How to fill in the F4E Title Block

1 This is the F4E drawing or model number, instructions will be found in F4E QA document F4E-QA-112

2 "Drawing Title" there is 3 lines of text available to describe the drawing assembly or part precisely; each line has 35 characters available. Use the ITER instructions, see F4E CAD Manual Section 2

3 The "DRAWING SCALE" box will be filled in with the main scale.

4 If the suppliers have their own drawing number this can be added to the "SUPPLIER DRAWING No" box

5 The "CONTRACT No." box will be filled in with the F4E contract number

6 This is the work flow process. It will be automatically activated when the F4E PLM system is operational. If the design work is produced by F4E then only the F4E right hand column will be filled in. If the design is produced by a supplier then the left hand column will be filled in.

- The supplier's designer fills in "SUPP. DRAWN" box using his or her initials (3 max).

- If the suppliers have their own 3D model numbers the "SUPP. 3D model(s) No. used to create the DRW" box (Balloon No. 10) will be filled in.
- When the design has reached some maturity, the design will be checked by the supplier's DO and if approved, the "SUPP. CHECKED" box will be filled in using the checker's initials (3 max).
- It is then passed to the supplier's head of the design office HDO. If he or she approves it the "SUPP. HDO" box will be filled in with the HDO's initials (3 max).
- It is then passed to the supplier's Executive Responsible Officer ERO.. If he or she approves it the "SUPP. ERO" box will be filled in with the ERO's initials (3 max). This is the top level approval for information to be passed to F4E.
- At the same time the date will be added to balloon No. 7 the "ISS DATE" box.
- The drawing will then be electronically sent to F4E

The F4E work flow will be started for the supplier's work

- F4E will carry out its internal review procedure of the supplier's drawing. When they are satisfied. The "F4E REV" box will be filled in with the F4E reviewer's initials (3 max).Note. This is a review not an approval.

7 See above

8 See above

9 The "F4E 3D model(s) No. used to create DRW" box will be filled in using the F4E number see F4E QA document F4E-QA-112

10 See above

11 The "F4E APPROVAL No." box will be filled in

12 The "F4E PLM REF" box will be filled in by the F4E PLM system when it is operational.

13 At the time of final approval and before issue to ITER the F4E logo and a note on Confidentiality and F4E Intellectual property rights will be added. The issuer is NOT ALLOWED to add any note regarding their Intellectual property rights to any drawing.

14 Part Maturity. This is the used for the part that contains the drawing document. The values are:

'CD' for 'Concept Design'
'DD' for 'Detail Design'
'TS' for 'Technical Specification'
'MD' for 'Manufacturing Design'
'AB' for 'As Built'
'AI' for 'As Installed'

3.1.7.4 Supplier Title Block

The supplier shall apply its own title-block in the bottom right hand corner of the drawing area. The title block supplier should be approved by F4E before to start producing drawings.

The supplier shall keep the bottom border and the right hand border clear of any grid line, graphical sign or text, these areas being reserved for DA and IO banners

3.1.7.5 Double Title Block Strategy

As an exception the double title block strategy will be accepted for contract where this strategy was already agreed. In that case the IO title block will be in the bottom right hand side corner and the F4E or supplier title block will be place above.

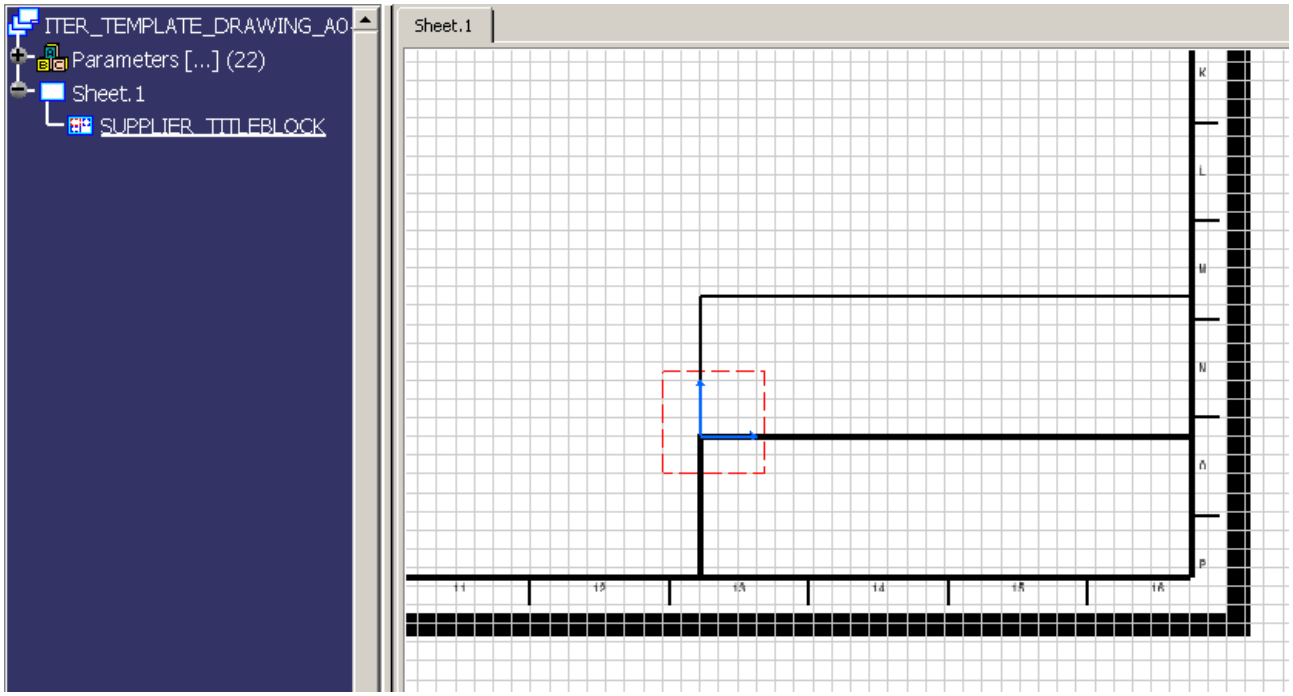


Figure 38.- Location of the F4E Title Block

3.1.8 Use of Multi-CAD by the Supplier

All direct design tasks to be sent to F4E shall be carried out using the F4E CAD system according to ITER IO requirements.

In the case of a design task involving a supplier not equipped with the F4E CAD system, subject to prior agreement with F4E, the use of Multi-CAD may be permitted, providing that the supplier complies with the following F4E requirements:

i. The supplier shall exchange with F4E the 3D CAD data and 2D drawings relevant for the control of design and associated interfaces in the CATIA version indicated in the latest version of the ITER CAD Manual section 7.1
ii. The supplier, shall be responsible for the consistency and accuracy of the geometry conversion from the originating CAD system to the CATIA V5 data passed to F4E
iii. The supplier shall be responsible for ensuring the consistency and accuracy between the 3D CAD data and the 2D drawings generated from this 3D data.
iv. The supplier shall be responsible to ensure that the CAD data can be used for downstream applications like drawing generation without limitation. (Both native CATIA V5 and PDF files will be generated)
v. F4E will provide to the supplier the constraints linked to the quality checker tool.

vi. The supplier shall provide, when exporting data to F4E, the 3D CAD data structure, including associated ITER attributes and values, identical to those exported by F4E down to the WorkPackage nodes (inclusion of converted models in a CATIA Product structure). The WorkPackage nodes will be identified in the data exchange Bill of Material (BOM) provided by F4E when exporting the models to the supplier.

vii. The identification of models and drawings shall comply with the F4E CAD numbering system, F4E QA document F4E-QA-112 to allow traceability and the history of objects modified or modelled in this PA

.

viii. F4E shall provide the 3D geometry in a single CATPart containing the conversion of the issuer WorkPackage content. This CATPart has the associated ITER attributes and values including the ID. The ID shall be identical for the same reference and kept through the versioning process. If the supplier receives a work package with CATIA "multi body" parts and has to separate them into "Cat parts for manufacturing drawings", when reconciled back into the ITER system they will retain the single part methodology.

ix. F4E will provide if needed specific checking procedures applied to Safety Important Components (SIC) and configuration DMU models.

3.2 Design Work carried out by the supplier

This section explains the wok flow and life cycle to be followed by the CAD data in the different schemes of design collaboration.

3.2.1 CAD Data work flow and life cycle in asynchronous mode

In an asynchronous scheme of design collaboration the data are exchanged based on the DET process. The complete lifecycle is described in the following presentation:

F4E_D_2429GU - CAD data Life Cycle in Asynchronous Scheme Design Collaboration

In an asynchronous scheme of collaboration the CAD data coming from the IO/suppliers will be accepted by F4E following the approval process for the DET. That means that the CAD data will be reviewed and accepted in an overall way.

Only when for contractual reasons a model by model approval/acceptance is required a F4E workflow signature process will be used, the F4E PLM system will be used (when available) to sign the models.

The CAD data transferred to F4E using the DET process will be checked from a quality point of view using Q-checker, a clash analysis will also be performed and the interfaces will be checked.

In the process the following signatures should be included:

- The F4E Technical Responsible Officer (TRO) must review and sign the models to allow the exchange.
- The F4E Project Leader must review and sign the models to allow the exchange.
- If value of contract exceeds XX Euros the F4E executive officer must sign for the models and drawings to allow the exchange.
- The F4E CAD office Head then reviews and signs for the transfer to take place

Once the workflow is completed in F4E@idm, the data is transferred to the IO for their approval or re-integrated into the IO database ENOVIA.

The IO, F4E and supplier should have their own work flow to approve the data.

3.2.2 CAD Data work flow and life cycle in a synchronous mode

As is explained in section 3.1.4 of this CAD manual the lifecycle of the CAD data, when a synchronous mode of scheme of collaboration is applied, is based on the ownership transfer. For each ownership transfer a DET will be issued to keep track of the data life cycle.

The life cycle values, roles, status of the data and work flows are defined in the IO document:

ITER_D_3G2ZE6 - CAD Working Group 08 - ENOVIA Lifecycle Dedicated to DAs and Partners

3.3 F4E Protocol of Collaboration with external DO

The design data to be modified is documented in an excel table. The export sheet will be provided and sent together with the design data.

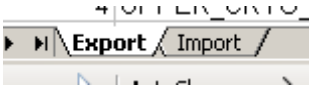
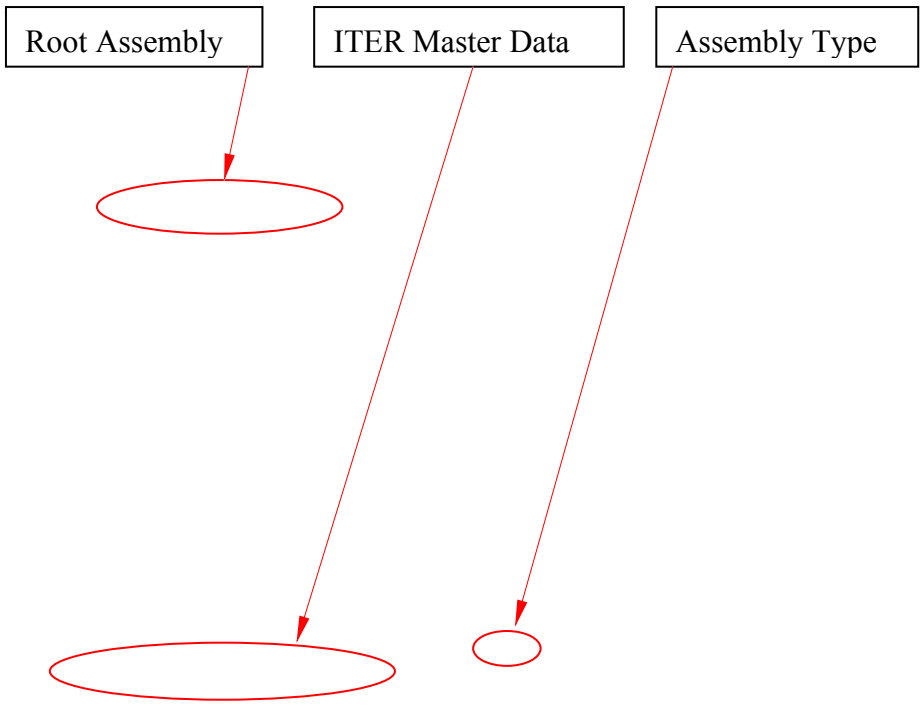


Figure 39.- Excel sheet tabs

The export worksheet contains a list of the exported data including the drawings and is showing the root assembly, ITER master data not to be modified and the assembly type.



Monday, June 05, 2006 11:37:29 AM								
	Not to be modified							
	Minor change							
	Major change							
	added							
Bill of Material: CRYOSTAT_PP								
Quantity	Part Number	Type	AT	Nomenclat	Revision	User In En	PBS 1	RO
1	CRYOSTAT#22VEN8	Assembly	__	DefaultDO	---	MURRAYS	24	BAREYTB
Bill of Material: CRYOSTAT#22VEN8								
Quantity	Part Number	Type	AT	Nomenclat	Revision	User In En	PBS 1	RO
1	BASEMENT#23KP2B	Assembly	__	DefaultDO	---	MURRAYS	24	CARBONC
1	LOWER+EQ_LEVEL#22VEKN	Assembly	__	DefaultDO	---	MURRAYS	24	UTINY
Bill of Material: BASEMENT#23KP2B								
Quantity	Part Number	Type	AT	Nomenclat	Revision	User In En	PBS 1	RO
1	RING_PEDESTAL#237HED	Part	__	_	---	MURRAYS	24	CARBONC
1	HORIZONTAL_BASE#237JXE	Part	__	_	---	MURRAYS	24	CARBONC
4	RH_ACCESS_PORT#237K3C	Part	__	_	---	MURRAYS	24	CARBONC
17	VV_COOL_LINE_SHROUD#237MJ4	Part	__	_	---	MURRAYS	24	CARBONC
1	PF4_FEEDER_LINE#237ML5	Part	__	_	---	MURRAYS	24	CARBONC
2	VV_DRAIN_LINE_PIPE#237MN2	Part	__	_	---	MURRAYS	24	CARBONC
4	RH_CLOSURE_PLATE#237MVR	Assembly	__	_	---	MURRAYS	24	CARBONC
9	VV_SUPP_DAMPER_PENET#237MY7	Part	__	_	---	MURRAYS	24	CARBONC
19	FEEDER _PIPE#238JBC	Part	__	DefaultDO	---	MURRAYS	10	BAREYTB
1	STRUCTURES_COOL_PIPE#238JFA	Part	__	_	---	MURRAYS	24	CARBONC
1	FASTENERS#WP#23953Q	Assembly	WP	_	---	MURRAYS	24	CARBONC
1	BASEMENT_CSKE#239HKX	Part	__	_	---	MURRAYS	24	CARBONC
1	LOWER_CYLINDER_INNER#239M9K	Part	__	_	---	MURRAYS	24	CARBONC
17	VV_COOL_SHROUD_MIR#239QXP	Part	__	_	---	MURRAYS	24	CARBONC
18	VV_SUPP_TIEROD_PENET#23CMUU	Part	__	_	---	MURRAYS	24	CARBONC
1	BASE_CENTER_COVER#23KNYG	Part		DefaultDO	---	MURRAYS	10	BAREYTB

Figure 40.- Export Worksheet

The supplier has to copy the ‘export’ worksheet and re-name to ‘import’ worksheet and add the following information.

- Minor and major changes
- Added/new data

Monday, June 05, 2006 11:37:29 AM				
	Not to be modified by supplier			
	Minor change			
	Major change			
	Added			
Bill of Material:	CRYOSTAT_PP			
Quantity	Part Number	Type	Option	Version
1	CRYOSTAT#22VEN8	Assembly	DefaultDO	---
	CRYOSTAT_ASSY_2D#23VEL9.CATDrawing	**DRW**		
Bill of Material:	CRYOSTAT#22VEN8			
Quantity	Part Number	Type	Option	Version
1	FASTENERS#WP#23953Q	Assembly	_	---
1	BASEMENT_CSKE#239HKX	Part	_	---
1	LOWER_CYLINDER_INNER#239M9K	Part	_	---
17	VV_COOL_SHROUD_MIR#239QXP	Part	_	---
18	VV_SUPP_TIEROD_PENET#23CMUU	Part	_	---
1	BASE_CENTER_COVER#23KNYG	Part	DefaultDO	---
3	MAN_ACCESS#WP#237MW6	Assembly	_	---
18	SUPPORT_COLUMN#239528	Part	_	---
	SUPPORT_COLUMN#23VEKQ--A.CATDrawing	**DRW**		
Bill of Material:	RH_CLOSURE_PLATE#237MVR			
Quantity	Part Number	Type	Option	Version
1	RH_PORT_CLOS_PLAT#237MU9	Part	_	---
Bill of Material:	FASTENERS#WP#23953Q			
Quantity	Part Number	Type	Option	Version
60	FASTENER_AT_PEDESTAL##23955R	Part	_	---
Bill of Material:	MAN_ACCESS#WP#237MW6			
Quantity	Part Number	Type	Option	Version
1	MAN_ACCESS_FLANGE#237MS8	Part	_	---
1	MAN_ACCESS_COVER#237MQ3	Part	_	---

Figure 41.- Import Worksheet

3.4 The F4E DET (Data Exchange Transfer) Process

All exchanges of CAD design data, between suppliers and F4E must be made through the F4E design office (Barcelona) using the F4E DET form. This form is used for suppliers to request design data, and also to request design data to be reintegrated back to the IO database ENOVIA V5.

For transfers in either direction the following information is mandatory for the exchange to take place.

The F4E Contract number

The Requester's name and Organisation

The F4E Responsible Officer

The F4E data request number will be given by F4E.

The completed form will be sent to F4E,

E-mail address data-exchange@f4e.europa.eu

The F4E DET Contact Person Mark Mills mark.mills@f4e.europa.eu
Tel +34 93 320 1810, will then check for consistency and pass on to the F4E Data Coordinator Claudia Delgado claudia.delgado@f4e.europa.eu Tel +34 93 320 1822
The following pages show the DET form template

ITER	Data Exchange Task	DET-XXXXX

Sections A,B,C to be filled by Requester and/or DA
Sections D,E ,F,G to be filled by the preparer of data, at the collection phase

A) REQUEST OF CAD DATA EXCHANGE

FUSION FOR ENERGY

Fusion For Energy
Josep Pla, 2
Torres Diagonal Litoral – Edificio B3, 11ª Planta
E-08019 Barcelona – ESPAÑA

FORM CADMay09
E-mail: data-exchange@f4e.europa.eu
mark.mills@f4e.europa.eu
claudia.delgado@f4e.europa.eu
Tel.+34-93-320-1810 or 1816 Fax:+34-93-320-1804

F4E CAD Data Request Number:	**Supplied by F4E**
Date	**XX/XX/XX**
Related to F4E Contract Number:	**XXXXXXXXX**

Request To Receive data from the IO	
Requester's Name XXX	**Organisation** XXX
F4E RO Name: Signature: Date:	YES NO Comments:
F4E Head of CAD Office Name: Signature: Date:	YES NO Comments:
Request Sent to The IO	Name: Signature: Date:
Data sent to the Requester	Name: Signature: Date:

Request To Send data to the IO	
Requester's Name	**Organisation**
F4E RO Name: Signature: Date:	YES NO Comments:
F4E Head of CAD Office Name: Signature: Date:	YES NO Comments:
Data sent to the IO	Name: Signature: Date:

ITER	Data Exchange Task	DET-XXXXX

B) DESCRIPTION OF DATA EXPORT CONTEXT:			
Data exchange Recipient	**Organisation/**Contact Person :		
	F4E / DO Contact persons :		
Data exchange related to study:	**Title :**		
	Contract or Agreement Number :		
* If not related to existing DWO or to ITA, please complete parts E and F of this document			
This DET follows a previous exchange operation (Update)	**YES**		**If Yes, Previous DET :**
	NO*		DET-_ _ _ _ _
Purpose of the data exchange within the study scope:			

C) DATA TO BE EXPORTED:
Identification of the data exported:

ITER	Data Exchange Task	DET-XXXXX

D) DATA EXPORT STATUS:		
Data sent as:		**Relevant Use case / DOCC Check List**
For DMU Reintegration (F4E->IO)		+ Partner: Exchange BOM reviewed and filled, provided in the returned data. The CAD design Actions have to be stopped on partner side until further communication by ITER IO DO + IO: See dedicated reconciliation procedures, and approval processes
Design data (First shot)		+ If alternative design, organise the relevant Enovia structure + If not alternative design, Transfer design data ownership (transitory: lock data) + Check Master data ownership + Generate data exchange BOM + Provide Partner with data exchange BOM + Provide Partner with ITER supplier package
Contextual data		Subscription on major change of Interface data
For information only		Warn partner this information is not relevant for CAD design
Important Information regarding the data exported:		

ITER	Data Exchange Task	DET-XXXXX

E) DATA DESCRIPTION:				
Root Assembly name:		**Enovia based data**	**Yes**	
			No	
The CATIA assembly opened at partner's site should look like this:				
The data described here can be collected at the following FTP adress:	SITE : ftp://ftpold.iter.org/EUtoGA File: EUtoGA.zip (Partner's Username and password should have been given prior to sending operation)			

ITER	Data Exchange Task	DET-XXXXX

F) DATA EXPORT REQUEST: ACTORS:		
Data requested by:		
Task owner: ITER RO:		
F4E's Task officer:		
Reviewed by ITER DI RO:		
Data prepared by:		
Data exported by:		

G) INTERFACE DESCRIPTIONS AND CORRESPONDING R.O.		
Geometrical Interface description	**Responsible Officer**	**Comments including CAD model number.**
Non-geometrical Interface description	**Responsible Officer**	**Comments.**

DET_EU_Form_Template_V1.0r.doc4 Template – IDM ID: **ITER_D_25DD6M** Page 5 of 5

Figure 42.- DET Form

3.5 Design Log Book

The Design Log Book shall be created and maintained for each WorkPackage (the supplier will be involved in this process)

After the installation of the ITER CAD Supplier Package version 4.3.3, the use of the design logbook is mandatory; see the sections 2.3.1, 2.4.1 and 2.6.1.