

## Guideline/Handbook (not under Configuration Control)

# CAD Manual 01 - Introduction

Introduction to the ITER CAD MANUAL and its usage.

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# **MQP**

## **ITER CAD Manual**

### **Introduction**

#### **Abstract**

This document outlines the role of the DO and scope of the ITER CAD Manual

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# 1 INTRODUCTION

The ITER CAD Manual shall be used by the members of the IO DO, IO RO, DA DO and Suppliers.

The purpose of the ITER CAD Manual is to describe all aspects of the IO DO including the following:

## 1.1 ITER Organization Design Office (IO DO)

The IO DO is a service provider to the ITER Project. It is in charge of developing and updating the CAD data required for the various phases of the Project within the ITER organizational context.

The IO DO has developed an organization & practices aiming at:

- i. Fulfilling its responsibilities
- ii. Developing best practices and methodologies to use the ITER CAD tools
- iii. Collaborating with delocalized ITER Partners
- iv. Meeting the required levels of quality and efficiency for the ITER Project
- v. Improving the various processes

For further information see [CAD Manual 03 - DO Organization and Responsibilities \(249WQN\)](#)

## 1.2 ITER CAD Manual

The scope of the present CAD Manual is to define the current organization & best practices. It is part of the ITER Quality Assurance documentation and is written for the following ITER contributors:

- i. The ITER Site and Domestic Agencies (DA) DO Members.
- ii. The ITER Management, Quality Assurance, Design Integration, Responsible Officers & Engineers and Information Technology.
- iii. The Institutes working with ITER.
- iv. The ITER Suppliers & Contractors.

It covers the following topics:

- i. The terminologies used by the ITER DO  
Refer to [CAD Manual 02 - Glossary \(249WNP\)](#)
- ii. The organization and responsibilities of the ITER DO  
Refer to [CAD Manual 03 - DO Organization and Responsibilities \(249WQN\)](#)
- iii. The ITER CAD design processes  
Refer to [CAD Manual 04-0 Introduction to Design Processes \(249WHA\)](#)
- iv. The ITER CAD design change management  
Refer to [CAD Manual 05 - Design Data Management \(249WSM\)](#)
- v. The applicable design standards  
Refer to [CAD Manual 07 - CAD Fact Sheet \(249WUL\)](#)
- vi. The ITER CAD design collaboration processes  
Refer to [CAD Manual 08 - Collaboration Processes \(249WV4\)](#)

- vii. The ITER CAD drawing best practices  
Refer to [CAD Manual 09 - Drawing Best Practices \(24SNC9\)](#)
- viii. The ISO drawing standards used by ITER  
Refer to [CAD Manual 10 - ISO Drawing Standards \(24MZWV\)](#)
- ix. The Equipment and Systems used for ITER plant design  
Refer to [Draft Manual 11 - Equipment & Systems \(25N9DS\)](#)
- x. The Plant Design Layout Guidelines  
Refer to [CAD Manual 12-0 Introduction to Plant Design Layout Guidelines \(282BPW\)](#)
- xi. The Diagram Guidelines  
Refer to [CAD Manual 14 - Diagram Guidelines \(35CY6V\)](#)
- xii. The ITER DO Abbreviations list  
Refer to [DO Abbreviations \(24844F\)](#)

The Design Collaboration topic is fully covered by the Protocol of Design Collaboration. Refer to [Procedure for the Usage of the Protocol of CAD Design Collaboration \(2EGJ27\)](#).

## 1.3 IO CAD System

### 1.3.1 IO CAD Software Currently Installed

The ITER DO is equipped with the following software:

- i. CAD system - CATIA V5(Mechanical + Equipment & Systems modules).
- ii. CAD data-base: ENOVIA LCA (Life-Cycle Activities) – VPM V5.
- iii. ENOVIA LCA Viewer.
- iv. Assembly and maintenance simulation system – DELMIA.
- v. Process Flow Diagrams (PFD) and Process & Instrumentation Diagrams (P&ID) CAD System - IGE-XAO - SEE-VISIO.
- vi. CAD quality checker - Q-Check
- vii. Isometric drawing – ISOGEN
- viii. Mechanical design catalogues - CADENAS

### 1.3.2 Software under investigation by IO DO

The IO DO is investigating the following software for possible applicability for DO needs:

- 1. Specialized CAD software under consideration:
  - a. 3D data Tolerancing (such as 3DCS)
  - b. Metrology
  - c. Data exchange management (such as DXM)
- 2. Engineering related data production & management software:
  - a. Finite Element Analysis (ANSYS)
  - b. Requirement management (DOORS)
  - c. Time management (PRIMAVERA & MS Project)
  - d. Electrical analysis software (ETAP)
  - e. Neutronics analysis (Monte-Carlo codes)

- f. MS Office
- 3. Other engineering related software packages:
  - a. Engineering data-base - MATRIX
  - b. Diagnostics analysis - OPTIS

## 1.4 ITER Collaboration schemes

The ITER 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.

The ITER design work is performed according to one of the 3 following collaboration schemes:

- i. Design work performed by ITER (site & DAs) & Integrated Suppliers
- ii. Design work performed by Suppliers equipped with CATIA V5
- iii. Design work performed by Suppliers not equipped with CATIA V5

## 1.5 ITER Training Aids

The 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 by the IO DO.

The following different types of training aids are used

- 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”. This document has all the IDM hyperlinks used for training [Hyperlinks to CAD Manual - Training Docs - How To - Catalogs - What Is - avi \(24N3GT\)](#)