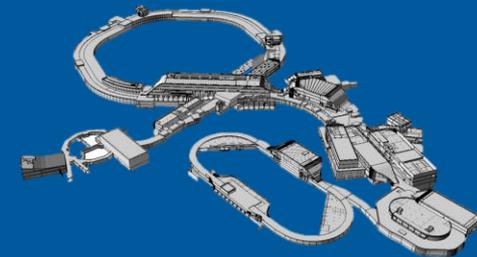




# Training Module: Design Reviews



December 5, 2019

# Agenda



# Motivation

## ISO 9001:2015, Chapter 8.3.4:

The organization shall apply controls to the design and development process to ensure that:

a) results to be achieved are defined;

b) reviews are conducted to evaluate the ability of the results of design and development to meet requirements;

c) verification activities are conducted to ensure that the design and development outputs meet the input requirements.



Focus of this training

# Introduction

- F-GS-F-01e (General Spec) defines *milestones*:
  - ...
  - **M6 = CDR (Conceptual Design Review)** accepted
  - **M7 = FDR (Final Design Review)** accepted
  - ...
- F-VA-QUA-en-0006: **Concept** phase, **development** phase, and **preparation of production** for a component or system (...) shall be verifiably closed by different *design reviews*.

# Agenda



# Documents

- Procedure (VA): **F-VA-QUA-en-0006 Design Reviews**  
<https://edms.cern.ch/document/1514206>
  - and documents mentioned therein
- F-GS-F-01: **General Spec**  
<https://edms.cern.ch/document/1365092>
  - and documents mentioned therein
- F-TG-MDS-en-KRL: **Design Guideline for Mechanical Design**  
<https://edms.cern.ch/document/1229367>
- F-TG-ET-01e: **Electrical Design Rules and Regulations**  
<https://edms.cern.ch/document/1172862>
- DGUV 202-002: **Manufacturing and operation of equipment designed for research purposes**  
<https://publikationen.dguv.de/dguv/pdf/10002/202-002eng.pdf>

# Agenda



# Review Process [1/2]

- **Prepare** the review (responsible: WPL)
  - Get the required documents well in advance (min. 2 weeks)\*
  - Make the documents accessible for all participants (in DMS)
  - Invite participants, i.e. WPL, SPL, QUA, contractor (optional: further relevant departments)
  - Compile a list of all applicable test criteria (from the contract and its co-applicable documents – e.g. GS, CS, DS, TGs)
  - All participants check the documentation against “their” test criteria
- **Execute** the review (responsible: WPL)
  - All test criteria as listed will be addressed (requirements)
  - All results and decisions shall be recorded in the Meeting Minutes and Acceptance Record
  - After mutually completing the review of all relevant aspects and criteria of the component, the participants shall agree on an overall result

\*) The contractor itself stores those documents into DMS

# Review Process [2/2]

- **Finalize** the review (responsible: WPL):
  - Accepted (if all test criteria are fulfilled),
  - Conditionally accepted (if minor modifications are considered necessary and can be closed quickly), or
  - Rejected (else).
  - Fill the result in the “Acceptance Record”
  - Upload documents (acceptance record, meeting minutes, etc.) in DMS and start the release process
- **What if not all criteria are fulfilled?**
  - If there was a rejection, reschedule the review meeting.
  - If there was a conditional acceptance, the Contractor has to make the updates and the review shall be repeated for said topics
  - If a review fails, it shall be simply finalized as soon as the required amendments are completed

# Content of CDR

The objective of the CDR is releasing the concepts, 3D models, and draft drawings of the product, so they can be detailed

- Needed documents:
  - » Concept,
  - » a schematic sketch of the component,
  - » calculations and simulations for ist dimensioning,
  - » Risk assessment,
  - » draft of production plan,
  - » draft of test and inspection plan,
  - » ...

The Template „Required Documents“ may help to identify additional required documentation:

- F-FO-QUA-bl-0013\_Required\_Documents  
<https://edms.cern.ch/document/1732710>

# Content of FDR

The objective of the FDR is releasing all documents (i.e. instructions, drawings, etc.) required for production of the component.

- Needed documents:
  - » complete production documents (user manual,...)
  - » test and inspection plan,
  - » work and test instructions,
  - » list of manufacturing and test equipment,
  - » set of production drawings and parts lists
  - » Updated risk assessment (if applicable)
  - » ...

The Template „Required Documents“ may help to identify additional documentation:

- F-FO-QUA-bl-0013\_Required\_Documents  
<https://edms.cern.ch/document/1732710>

# Templates for Documentation

|  |  |                          |
|--|--|--------------------------|
|  | <b>Acceptance Record</b> <i>Abnahmeprotokoll</i> | Date / Datum: yyyy-mm-dd |
|  |  | Page Seite 1 of von 2    |

Mark milestone. *Meilenstein markieren:*

CDR M6   
  FDR M7   
  PRE-SERIES M8   
  FAT M9   
  SAT Aa  SAT Ab M10  
 PRE-ASSEMBLY M10-P   
  INSTALLATION M102   
  SAT Ba M11   
  SAT Bb M12

Identify the component(s) concerned. *Die Komponente(n) identifizieren, um dich es sich handelt.*

|   |                                       |
|---|---------------------------------------|
| Component / System<br><i>Komponente / System:</i>         | AID:                                  |
| CID:  | PSP-Code:                             |
| Manufacturer / Supplier<br><i>Hersteller / Lieferant:</i> | Order number<br><i>Bestellnummer:</i> |

Reference all applicable documents (s. a. meeting minutes, design and acceptance reports, test records, etc.) *Verweise auf mitgeltende Unterlagen (z. B. Besprechungsprotokolle, Design- und*

**F-FO-QUA-bl-0002:  
Acceptance Record**

In the case of SAT Aa, complete this section. *Im Falle von SAT Aa füllen Sie diesen Abschnitt aus.*

Amount *Stückzahl:*  Transport damage *Transportschäden:*

Transport sensors *Transportsensoren:*  Packaging *Verpackung:*

Further remarks *Weitere Bemerkungen:*

In the event of a conditional acceptance or rejection: specify remarks and reference the corresponding NCR (<https://edms.cern.ch/document/1503137>). *Im Falle eines Vorbehalts oder Zurückweisung Gebe Bemerkungen an und verweise auf entsprechenden NCR (<https://edms.cern.ch/document/1503137>).*

Remarks e.g. for conditional acceptance

Designation of document *Dokumentenbezeichnung:*  
F-PP-[organizational\_unit]-bl-[document\_title]-V00X.pdf      Printed is not subject to document control  
Template: F-FO-QUA-bl-0002\_Acceptance\_Record\_V003

Optional Attachments

|  |                        |                  |        |
|--|------------------------|------------------|--------|
|  | Kind of Document       | Template Number: | Page   |
|  | <b>Meeting Minutes</b> | F-FO-QUA-en-0012 | 1 of 2 |

|                         |  |
|-------------------------|--|
| <b>Meeting:</b>         | <b>Title of the Meeting</b>                                    |
| <b>Date:</b>            | <b>Author:</b> xxx   |
| <b>Participants:</b>    | Xxx, Yyy, ...  |
| <b>Distribution:</b>    | Participants + Zzz, ...  |
| <b>Document Number:</b> | F-PR-...<br>(see work instruction for document identification) |

**Contents:**  
< Table of contents is created automatically:  
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...

**F-FO-QUA-de-0012:  
Meeting Minutes**

|                 |  |   |   |
|-----------------|--|---|---|
|                 | <ul style="list-style-type: none"> <li>• Xxxx → done / open</li> <li>• Xxxx → done / open</li> <li>• Xxxx → done / open</li> </ul> |   |   |
| <b>2. Topic</b> |  |   |   |
| x               | xxx  | x | x |
| <b>3. Topic</b> |  |   |   |
| x               | xxx  | x | x |
| <b>4. Topic</b> |  |   |   |
| x               | xxx  | x | x |
| <b>5. Topic</b> |  |   |   |
| x               | xxx  | x | x |
| <b>6. Topic</b> |  |   |   |
| x               | xxx  | x | x |

F-FO-QUA-en-0012\_Template\_Minutes-V003.docx

# Agenda

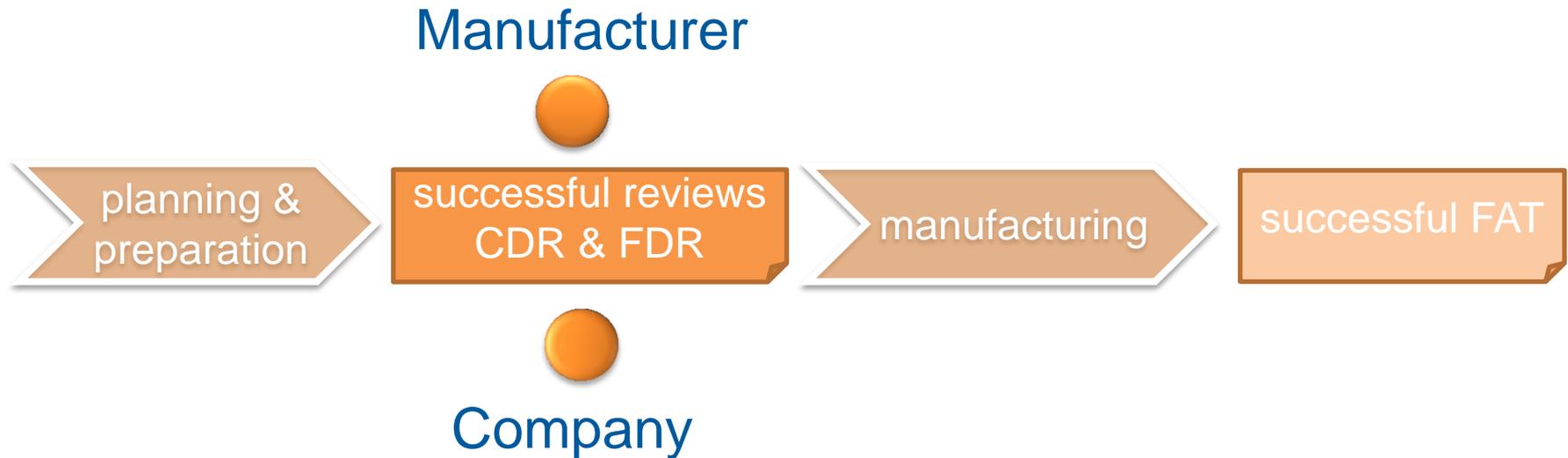


# Experiences & Tips [1/2]

- Read the related procedure and documents  
(Clarify questions with the authors in advance of the review)
- Get the required documentation well in advance of a review meeting (do not cut time for proper checking!)
- Be prepared and organized (list of criteria!) to have an easy review
- No work is done till the paperwork is done
  - Take care of the record and get it approved by the participants (done best immediately after the review)
  - Store and release documents (acceptance record and meeting minutes) in the corresponding container in EDMS
- Update the MS Project plan and provide link to acceptance record in EDMS

# Experiences & Tips [2/2]

Design Reviews are Preconditions for Manufacturing:



A successful CDR is mandatory for preparing the FDR



Conclusion: Well prepared Reviews guide to good products!

# Agenda



# Summary

- Concept phase, development phase and preparation of production for a component or system (i.e. an item) shall be ***verifiably closed*** by different ***design reviews***
- A review **compares the requirements with the achievements** at each project stage and documents the results of said comparison
- Use Acceptance Record template for each milestone
- Resulting records shall be **stored in DMS**
- Advantages:
  - ✓ Easier tracking of progress
  - ✓ Results of forthcoming steps will match expectations
  - ✓ Less unwanted surprises
  - ✓ Smoother collaboration
  - ✓ ...

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# Thank You!